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Comments to the "FEIS Response to Comments" (January 2006) on DEIS comments submitted by ARC Consultants.

Cooperative Monitoring , Evaluation, and Research Committee Work Plan (Section 3.5.4, FEIS 2006)

In this section the Services respond to questions concerning the CMER Work Plan, but fail to respond to my comments concerning the limitations faced by CMER in successfully completing all projects listed under the FPHCP's AM Program because *"the proposed research and monitoring projects exceed the availability of funding and the capabilities of human resources."*(Appendix H, FPHCP). Specifically, my comments read:

"The FPHCP Adaptive Management Program is not capable of fully implementing research and monitoring projects (through experimental design) as outlined in Schedules L-1 and L-2."

"As a direct result of over reliance on experimental design to answer important questions regarding scientific uncertainty and associated risk to aquatic species, the FPHCP AM program has built up a very ambitious research and monitoring program under the charge of CMER. The FPHCP consists of over 50 combinations of riparian prescriptions on Type S, F, and N waters (WAC 222-030-021,022,023) that require various levels of research and monitoring under the AM program as outlined in Schedules L-1 and L-2. According to the CMER Work Plan, additional monitoring is required of unstable slopes, roads, fish passage, wetlands, pesticides and wildlife (Appendix H, FPHCP)."

"Schedule L-1 addresses key questions designed to answer whether or not the FPHCP is meeting previously agreed upon Resource Objectives and Performance Targets designed to provide adequate protection and conservation of listed aquatic species. Schedule L-2 lists specific projects associated with the issues identified for adaptive management research in the Forest and Fish Report. The CMER Work Plan (Appendix H, FPHCP) was initially constructed to account for all the monitoring projects outlined in both of these schedules (L-1, L-2) as they were an integral part of the FFR "deal". Due to the large number and broad scope of individual research and monitoring projects, the complexity of the FPHCP riparian prescriptions, and the highly variable and relatively large landscape the rules are being applied to (10 million acres of Washington State), CMER has opted to categorize different projects into "Rule Groups" based on program type. Under Rule Group Structure and Definition in the CMER Work Plan (Appendix H, FPHCP) CMER defined rule groups as:"

"A rule group is a set of forest practices rules relating either to a particular resource, such as wetlands, or fish-bearing streams, or to a particular type of forest practice, such as road construction and maintenance. The rule groups are organized along the lines of the FFR appendices, including:

1. Riparian Strategy (FFR, Appendix B) which includes five sub-groups:
   - *a. Stream Typing*
   - *b. Type N Streams*
   - *c. Type F streams*
   - *d. Bull trout*
   - *e. Channel Migration Zones (CMZ)*

2. Unstable Slopes (FFR, Appendix C)
3. Roads (FFR, Appendix D)
4. Fish Passage (included in FFR, Appendix D, Roads)
5. Pesticides (FFR, Appendix E)
6. Wetland Protection (FFR, Appendix F)
7. Wildlife "

"Individual research and monitoring projects related to schedules L-1 and L-2 fall under one of the programs listed in Table 25. Individual projects are also broken down on a spreadsheet for budget forecast purposes and prioritization (CMER Forest & Fish Budget Funding Options April 21, 2005). This spreadsheet is updated monthly by the FFR Adaptive Management Administrator and serves as a reference to CMER activities as they relate to AM project status, priority, and costs through year 2010."

"The CMER spreadsheet indicates that many key AM research and monitoring projects that rely on experimental design as a substitute for upfront conservation measures have either been delayed or under funded (CMER Funding Options April 21, 2005). Of particular concern are the individual projects listed under the Type N Buffer Characteristics, Integrity and Function Program which was ranked No. 1 by CMER in Table 25. due to a high level of uncertainty in the science underlying related FFR rules, and the high level of risk "for detrimentally impacting aquatic resources". Of the six projects falling under this program, all related to headwater streams, only one has been prioritized "urgent". Four have been "delayed" with no action, and one is relegated to "second" (just below Urgent) pending additional review by CMER and potential budget shortfalls. This isn't very promising for a Rule Group Program that was ranked No. 1 by CMER (Table 25) based on the high level of uncertainty and risk associated with FFR rules guiding riparian prescriptions. In the absence of upfront conservation measures, delaying AM projects which already rely heavily on experimental design exposes aquatic species to additional risks on top of those already incurred through deferment of more comprehensive habitat conservation measures."

"In moving down the CMER Budget Spreadsheet (April 2005) and cross referencing it with the CMER program ranking list (Table 25, Appendix H, FPHCP) this disturbing trend is apparent throughout all of the Effectives and Validation Monitoring Programs and projects. Eastside Riparian Type F (rank No. 2 for high scientific uncertainty and

risk to the resource) has one of three projects listed as urgent; Type N Amphibian Response (rank No. 3) has 3 of 7 projects listed as second; Roads sub-basin Scale Effectiveness Monitoring (rank No. 4) has 1 project completed and 1 delayed; Type F Statewide Prescription Monitoring (rank No. 5) has 3 of 4 projects delayed; Mass Wasting Effectiveness Monitoring (rank No. 6) has 2 of 4 projects delayed; Bull Trout Overlay Temperature (rank No. 7) has 2 of 4 projects delayed; Forested Wetlands Revegetation Projects (rank No. 8) has 2 of 4 projects delayed; Wetland Mitigation delayed; Wetland Management Zone Effectiveness Monitoring delayed; Extensive Wetlands Trend Monitoring delayed; CMZ Effectiveness Monitoring delayed; Alternate Plan Assessment delayed; and similar results continue down the list. Even some Rule Tool projects, which by definition are designed to help validate and implement the current FPHCP rules and regulations on the ground, have been delayed (e.g. DFC Trajectory Model Validation and DFC Aquatic Habitat projects)."

"The above list represents the affect of state and federal budget shortfalls and CMER's inability to implement an ambitious Adaptive Management program due to limited staff, qualified project managers, budget, and other resources required of an AM program of this magnitude. *All* of the research and monitoring projects in the CMER work plan and budget need to be fully funded and implemented as they were derived from Schedules L-1 and L-2 which explicitly link FFR Resource Objectives and Performance Targets to specific projects associated with adaptive management research in the Forest and Fish Report. In other words, they were all part of the "deal". "

"Given that the FPHCP is "heavy" on experimental design and "light" on establishing good upfront conservation measures, it's critical that all AM research and monitoring projects get fully implemented on schedule to avoid exposing listed aquatic species to additional risk. Unfortunately, that has not been the case thus far. In Chapter 2 of the Draft EIS (Analysis of Alternatives, 2004), the FPHCP Alternative (2) states that Adaptive Management under this scenario will lead to a "robust and functionally effective program". The analysis further states:"

"Under Alternative 2, the adaptive management program would be in the rules as described in WAC 222-12-045 and summarized below. The adaptive management program is more fully described in the FPHCP. The FPHCP addresses the consistency between the State's adaptive management program and Federal ESA requirements. Receiving ESA take authorization through Section 10 of the ESA would provide the anticipated incentive and opportunity for the adaptive management program to be a robust and functionally effective program. FFR participants voluntarily provide technical support to the adaptive management process, as well as forest sites and logistical support for on-going research. Broad stakeholder support and participation in the FFR collaboration would ensure the program has sufficient resources to staff and carryout the anticipated research and monitoring effort. Under this alternative, it is expected that the program would continue to receive public funding as well as broad support and direct participation by stakeholders. The resulting adaptive management program would address, as anticipated, scientific uncertainty and the degree to which the current Washington Forests Practices Rules meet established resource goals and objectives."

"The current status of the FPHCP AM program as outlined in the CMER Budget and Work Plan demonstrates the failure of Alternative 2 in meeting anticipated program

goals. The above statement also contradicts language in the FPHCP (Appendix H) for setting program priorities under the CMER work plan which directly addresses the limitation of the FFR Adaptive Management program. In outlining the AM program ranking process the CMER Action Plan states:"

"The first step in the prioritization process was to rank the relative importance of proposed programs in meeting FFR goals and objectives in order to focus CMER resources and effort on critical areas. This is an important step because over the near-term the proposed research and monitoring projects exceed the availability of funding and the capabilities of human resources.."

"This last sentence captures one of the main problems inherent in attempting to implement an AM program of this scale (covering 10 million acres) that is over-reliant on experimental design to answer key questions pertaining to scientific uncertainties and associated aquatic resource risk. As "high risk/low certainty" projects continue to get delayed due to unforeseen funding shortages directly effecting AM program resources and personnel constraints, listed aquatic species are put at even greater risk to "detrimental impacts" that could "undermine the intent of FFR goals" (FPHCP, Appendix H, 2004)."

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**CMER BUDGET PROPOSAL 6/29/05**	Priority	PROJ STATUS	FY 01 thru FY 05	FY 2006 7/05-6/06	FY 2007 7/06-6/07	FY 2008 7/07-6/08	FY 2009 7/08-6/09	FY 2010 7/09-6/10	FY 2011 7/10-6/11	FY 2012 7/11-6/12	Total FY 06 thru FY 12	Grand Total		
2	**Effectiveness/Validation Monitoring Programs & Projects**		1 to 10												
3	**Type N Buffer Characteristics, Integrity and Function**			323,000	671,667	884,631	902,267	834,500	791,295	550,828	119,132	4,664,310	4,977,310		
4	Type N Buffer Characteristics, Integrity and Function Project	Urgent	6	225,000	250,000	250,000	250,000	250,000	250,000			1,250,000	1,475,000		
5	Type N Experimental Buffer Treatment Feasibility Study	Completed	6	98,000									98,000		
6	Type N Experimental Buffer Treatment	Second	3		321,667	634,631	652,267	584,500	541,295	550,828	119,132	3,404,310	3,404,310		
7	*Type N WQ/downstream effects*	Delay													
8	*Type N Performance Target Validation*	Delay													
9	*Type N Classification*	Delay													
10	**Eastside Riparian Type F**			220,000	200,000	200,000						400,000	620,000		
11	LWD Literature Review	Second	8	80,000	40,000							40,000	120,000		
12	Disturbance Regime Literature Review	Second	8	80,000	20,000							20,000	100,000		
13	Eastside Riparian Current Condition Assessment	Urgent	2	60,000	140,000	200,000						340,000	400,000		
14	**Type N Amphibian Response**			649,723	118,000	162,000	147,000	70,000				497,000	1,146,723		
15	SAA Detection/Relative Abundance Methodology (linked to Type N Exp)	Finish	6	345,600	11,000							11,000	356,600		
16	Tailed Frog Literature Review & Meta-analysis	Finish	6	93,123									93,123		
17	Dunns & van Dykes Salamander	Finish	6	104,000									104,000		
18	Tailed Frogs & Parent Geology	Second	1			70,000	70,000	70,000				210,000	210,000		
19	Buffer Integrity-Shade Effectiveness	Second	6	80,000	77,000	77,000	77,000					231,000	311,000		
20	Amphibian Recovery	Completed	10	27,000									27,000		
21	Amphibians in Intermittent Streams	Second	1		30,000	15,000						45,000	45,000		
22	**Roads sub-basin scale Effectiveness Monitoring**			79,542									79,542		
23	Road Surface Erosion (RSE) Model Update	Completed	10	79,542									79,542		
24	Road Surface Erosion Model Validation/Refinement	Delay													
25	**Type F Statewide Prescription Monitoring**			75,000	30,000	330,000	330,000	330,000	330,000			1,350,000	1,425,000		
26	Type F Riparian Prescription Monitoring Project (Westside)	Second	3	75,000		300,000	300,000	300,000	300,000			1,200,000	1,275,000		
27	Type F Riparian Prescription Monitoring Project (Eastside)	Urgent	1		30,000	30,000	30,000	30,000	30,000			150,000	150,000		
28	*Type F Experimental Buffer Treatment*	Delay													
29	*Type F Performance Target Validation*	Delay													
30	**Mass Wasting Effectiveness Monitoring**				20,000	227,000	250,000	200,000	100,000			797,000	797,000		
31	Effectiveness of Unstable Landform Identification	Urgent	1		20,000	150,000	150,000					320,000	320,000		
32	Mass Wasting Prescription-scale Effectiveness Monitoring	Urgent	1			77,000	100,000	200,000	100,000			477,000	477,000		
33	Mass Wasting Buffer Integrity & Windthrow Assess.	Delay													
34	Mass Wasting Landscape-Scale Effectiveness Monitoring Project	Delay													
35	**Bull Trout Overlay Temperature**			1,212,600	310,600	107,650	107,650					526,900	1,738,500		
36	Bull Trout Overlay Temperature Project	Urgent	6	825,820	224,920	78,730	78,730					382,380	1,208,200		
37	Solar Radiation/Effective Shade	Finish	6	386,780	85,680	28,920	28,920					143,520	530,300		
38	Groundwater Conceptual Model	Delay													
39	Groundwater Research Studies (amounts updated 3/9/05)	Delay													
40	**Forested Wetlands Revegetation Effectiveness**			104,913									104,913		
41	Forested Wetlands Literature Review & Workshop	Completed	10	54,913									54,913		
42	Statewide Forested Wetland Regeneration	Completed	10	50,000									50,000		
43	Wetland/Stream Water Temperature Interactions	Delay													
44	Wetland Hydrology Connectivity Project	Delay													
45	**Road Site-scale Effectiveness Monitoring**					50,000	100,000	150,000	100,000			400,000	400,000		
46	Effectiveness of Identifying RMAP Priority Fixes	Second	0												
47	Road Site-Scale Effectiveness Monitoring	Second	0			50,000	100,000	150,000	100,000			400,000	400,000		
48	**Hardwood Conversion**			392,169	130,055	177,942						307,997	700,166		
49	Hardwood Conversion Project	Finish	6	387,169	80,055	177,942						257,997	645,166		
50	WDOE Temperature Modelling	Finish	1	5,000	50,000							50,000	55,000		
51	**Wetland Mitigation**	Delay	0												
52	**Fish Passage Effectiveness Monitoring**	Second	0		100,000	200,000	200,000	200,000	200,000			900,000	900,000		
53	**Wildlife Program (State General Fund)**			758,076	124,890							124,890	882,966		
54	RMZ Resample Project	Finish	6	758,076	124,890							124,890	882,966		
55	**Wetland Management Zone Effectiveness Monitoring**	Delay													
56	**CMZ Effectiveness Monitoring**														
57	*CMZ Function Assessment*	Delay													
58	*CMZ Integrity Monitoring*	Delay													
59	*Alternate-Plan Assessment*	Delay													
60	**Forest Chemicals**														
61	*Chemical Application Monitoring Project*	Delay													
62															
63															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**CMER BUDGET PROPOSAL 6/29/05**	**Priority**	**PROJ STATUS**	**FY 01 thru FY 05**	**FY 2006 7/05-6/06**	**FY 2007 7/06-6/07**	**FY 2008 7/07-6/08**	**FY 2009 7/08-6/09**	**FY 2010 7/09-6/10**	**FY 2011 7/10-6/11**	**FY 2012 7/11-6/12**	**Total FY 06 thru FY 12**	**Grand Total**		
64	**Extensive Status & Trends Monitoring Programs**														
65	Extensive Riparian Monitoring	Urgent	2		231,000	249,000	231,000	249,000				960,000	960,000		
66	Extensive Fish Passage Trend Monitoring	Delay	2	24,300									24,300		
67	Road Sub-Basin Scale Effectiveness Monitoring	Urgent	4		356,230	362,185				300,000	300,000	1,318,415	1,318,415		
68	*Extensive Wetlands Trend Monitoring*	Delay													
69															
70															
71	**Intensive Watershed-Scale Monitoring Programs**														
72	Cooperative Statewide Intensive Monitoring Program														
73	CMER Contribution to Cooperative Effort	Urgent	1		100,000	400,000	375,000	375,000	375,000			1,625,000	1,625,000		
74	*LWD/Aquatic Habitat Linkage Program*														
75	*Eastside Aquatic Habitat/Fish Response*														
76	*Estimate Habitat Abundance as Function of Temp, Wood, and Sediment*														
77	*Approach to Estimate Fish Production as a Function of Fish Habitat*														
78	*Road Performance Target Validation*														
79	*Validate Road Sediment Performance Targets*														
80	*Validate Road Runoff Performance Targets*														
81	*Downstream Water Quality/Fish Response*														
82	*Downstream Effect of Exports from Type N Streams*														
83	*Mass Wasing Target Validation Program*														
84															
85															
86	**Compliance Monitoring Programs**														
87	Compliance Monitoring Program Development														
88	DNR/CMER Cooperative Effort (Protocol Development)	Completed	6	60,000									60,000		
89															
90															
91	**Rule Tool Programs**														
92	**Type N Delineation ("PIP" studies)**			70,666									70,666		
93	Perennial Stream Survey Pilot	Completed	10	70,666									70,666		
94	Perennial Stream Survey (Full Statewide Project)	Delay													
95	**Sensitive Site Program (Stream Associated Amphibians)**			328,800									328,800		
96	SAA Sensitive Site Identification Methods/Site Characterization	Completed	10	328,800									328,800		
97	**Stream Typing ("Water Typing")**			1,396,403	480,000	480,000	200,000					1,100,000	2,496,403		
98	Last Fish/Habitat Prediction Model Development	Implement	6	1,116,403	50,000	50,000						100,000	1,216,403		
99	Last Fish/Habitat Prediction Model Field Performance Assessment	Implement	3	80,000	200,000	200,000						400,000	480,000		
100	Annual/Seasonal Variability Project	Implement	2	200,000	200,000	200,000	200,000					600,000	800,000		
101	*Guidelines for Field Protocol to Locate Mapped Divisions*	Delay													
102	**Type F DFC Validation**			150,000									150,000		
103	DFC Target Validation	Completed	10	150,000									150,000		
104	DFC Trajectory Model Validation	Delay													
105	*DFC-Aquatic Habitat*	Delay													
106	**Eastside Temperature Nomograph Project**	Finish	8	85,000									85,000		
107	**Bull Trout Habitat Identification Program**														
108	Bull Trout Presence/Absence Protocols	Delay													
109	Bull Trout Habitat Prediction Models	Delay													
110	**Unstable Landform Identification**			853,750	650,000	650,000						1,300,000	2,153,750		
111	Shallow Rapid Landslide Screen for GIS	Delay													
112	Technical Guidelines for Geotechnical Reports	Delay													
113	Regional Unstable Landforms Identification (Map/Deep-Seated Screen)	Completed	10	20,000									20,000		
114	Landform Hazard Classification System & Mapping Protocols	Completed	10	33,750									33,750		
115	Landslide Hazard Zonation (completed to date)	Completed	10	800,000									800,000		
116	Landslide Hazard Zonation	Implement	6		650,000	650,000						1,300,000	1,300,000		
117	**Glacial Deep-seated Landslide Program**			22000									22,000		
118	Model Evapo-Transpiration in Deep-Seated Landslide Recharge Areas	Completed	10	22,000									22,000		
119	Method to Assess Vulnerability of Deep-Seated Landslides to Timber Harvest	Delay													
120	**Wetland Tool Program**				30,000	125,000	125,000	125,000	125,000			530,000	530,000		
121	Hydrogeomorphic Wetland Classification System	Delay													
122	DNR GIS Wetlands Data Layer	Implement	1		30,000	125,000	125,000	125,000	125,000			530,000	530,000		
123	**CMZ Delineation Program**														
124	*CMZ Screen & Aerial Photograph Catalog*	Delay													
125	*CMZ Boundary Identification Criteria*	Delay													
126															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**CMER BUDGET PROPOSAL 6/29/05**	**Priority**	**PROJ STATUS**	**FY 01 thru FY 05**	**FY 2006 7/05-6/06**	**FY 2007 7/06-6/07**	**FY 2008 7/07-6/08**	**FY 2009 7/08-6/09**	**FY 2010 7/09-6/10**	**FY 2011 7/10-6/11**	**FY 2012 7/11-6/12**	**Total FY 06 thru FY 12**	**Grand Total**		
127															
128	**Miscellaneous Projects and Expenses**														
129	Atterbury Landowner Data Purchase	Completed		10,800									10,800		
130	Thermograph Purchases	Completed		1,628									1,628		
131	Stream Temperature Workshop	Completed		22,002									22,002		
132	*Digital Orthophoto and Aerial Photo Purchases*														
133															
134															
135															
136															
137	**Program Administration & Project Management**														
138	DNR Indirect Cost (General Fund State only)	Urgent		119,323									119,323		
139	AM Program Administrator (Geoff McNaughton, DNR)	Urgent		475,085	87,056	87,056	87,056	87,056	87,056	87,056	87,056	609,389	1,084,474		
140	Contract Specialist (Dawn Hitchins, DNR)	Urgent		193,902	58,265	58,265	58,265					174,795	368,697		
141	CMER Facilitation (Thompson & Smitch)	Urgent		28,800	9,600	9,600	9,600	9,600	9,600	9,600	9,600	67,200	96,000		
142	CMER Staff (NWIFC)	Urgent		1,748,017	410,416	410,416	410,416	410,416	410,416	410,416	410,416	2,872,912	4,620,929		
143	CMER Website (Jeff Schieber, DNR)	Urgent		23,120	11,656	11,656	11,656	11,656	11,656	11,656	11,656	81,592	104,712		
144	Scientific Review Committee (Univ. Wash)	Urgent		236,762	87,434	87,434	87,434	87,434	87,434	87,434	87,434	612,038	848,800		
145	Coop Fish & Wildlife Research Unit Dues (Univ. Wash)	Urgent		30,809	10,203	10,203	10,203	10,203	10,203	10,203	10,203	71,421	102,030		
146	Project Development Support (CMER Discretionary Fund)	Urgent		370,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	700,000	1,070,000		
147															
148	Total for Completed projects			1,829,101									1,829,101		
149	Total for new starts (doesn't include LHZ line 116)				1,308,887	897,000						2,205,887	2,205,887		
150															
151	Total for "Urgent" projects			4,336,438	2,126,780	2,571,545	1,989,360	1,820,365	1,471,365	1,016,365	1,016,365	12,012,142	16,348,580		
152	Total for "Finish" projects			2,164,748	351,625	206,882	28,920					587,407	2,752,155		
153	Total for "Second" projects			315,000	588,657	1,346,631	1,399,267	1,304,500	1,141,296	560,828	119,192	6,460,310	6,785,310		
154	Total for "Implement" (Rule Implementation Tools)			1,396,403	1,130,000	1,225,000	325,000	125,000	125,000			2,930,000	4,326,403		
155	Total for "Delay" with funds allocated			24,300									24,300		
156												06 to 12	Grand Total		
157															
158	**Expected Appropriation**			01 to 05	2006	2007	2008	2009	2010	2011	2012	06 to 12	Grand Total		
159	State General Fund			2,900,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	4,200,000	7,100,000		
160	Federal Forests & Fish (IAC #1, #2, #3, #4, #5, and #6), Italicized number is projected Fed '07			11,454,200	3,249,200	*3,249,200*						6,498,400	17,952,600		
161	USF&WS Bull Trout Funds			1,121,876									1,121,876		
162	Total Expected Appropriation			15,476,076	3,849,200	3,849,200	600,000	600,000	600,000	600,000	600,000	10,698,400	26,174,476		
163	Carry Forward (assumes no fiscal year limitations)				5,434,366	5,086,524	3,585,687	443,140	-2,206,724	-4,344,384	-5,311,576	-5,847,079			
164	Total Funds Available for That Year			15,476,076	9,283,566	8,935,724	4,185,687	1,043,140	-1,606,724	-3,744,384	-4,711,576				
165	Annual Variance (Total Funds Avail minus Total Expenditures, row 164 minus row 157)			5,434,366	5,086,524	3,585,687	443,140	-2,206,724	-4,344,384	-5,311,576	-5,847,073				
166															
167															
168	"Urgent" = highest priority projects	"Implement" = DNR / Policy priority for Rule Tools and Admin													
169	"Finish" = projects with sizable investment already made														
170	"Second" = projects of secondary importance to the "Urgent" projects														
171	"Delay" = work has not begun	Note: Program Administration does not include funds for data management, an identified need of the program													
172															
173	**Project Status Codes:**														
174	0 Pre-scoping														
175	1 Scoping complete														
176	2 Study Design Phase														
177	3 Study Design Complete														
178	4 in Contracting Process														
179	5 Contract Signed														
180	6 Project Underway														
181	7 Interim Report Available														
182	8 Draft Report Submitted to CMER														
183	9 Final Report thru SRC														
184	10 Report Accepted and Published														
185															
186															
187															
188															
189															
190															
191															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**CMER BUDGET PROPOSAL 6/29/05**	Priority	PROJ STATUS	FY 01 thru FY 05	FY 2006 7/05-6/06	FY 2007 7/06-6/07	FY 2008 7/07-6/08	FY 2009 7/08-6/09	FY 2010 7/09-6/10	FY 2011 7/10-6/11	FY 2012 7/11-6/12	Total FY 06 thru FY 12	Grand Total		
192															

		10,041,69
Expected Appropriation		**01 to 05**
State General Fund		2,900,0C
Federal Forests & Fish (IAC #1, #2, #3, #4, #5, and #6), italicized number is projected Fed '07		11,454,2C
USF&WS Bull Trout Funds		1,121,87
Total Expected Appropriation		15,476,07
Carry Forward (assumes no fiscal year limitations)		
Total Funds Available for That Year		15,476,07
Annual Variance (Total Funds Avail minus Total Expenditures, row 164 minus row 157)		5,434,38

"Urgent" = highest priority projects
"Finish" = projects with sizable investment already made
"Second" = projects of secondary importance to the "Urgent" projects
"Delay" = work has not begun

"Implement" = DNR / Policy priority for Rule Tools and Admin

Note: Program Administration does not inc

Project Status Codes:

0 Pre-scoping
1 Scoping complete
2 Study Design Phase
3 Study Design Complete
4 in Contracting Process
5 Contract Signed
6 Project Underway
7 Interim Report Available
8 Draft Report Submitted to CMER
9 Final Report thru SRC
10 Report Accepted and Published

Response to Services Response to Comments (Section 3.5.4, FEIS 2006)

The Services fail to acknowledge that CMER has not been able to successfully implement many of the previously ranked "high priority" FPHCP AM projects precisely because "the proposed research and monitoring projects exceed the availability of funding and the capability of human resources." As an example, refer to the above CMER Budget Proposal (dated 6-29-2005) that was approved by the Forest Practices Board for 2006, which shows that several of the Type N high priority projects have been delayed, as have many other projects that received priority ranking from CMER based on high scientific uncertainty and risk to aquatic resources.

The "Priority" column in this spreadsheet is misleading based on the definitions provided for "Urgent, Finish, Second, and Delay" in the last few rows. These "priorities" do not correspond to the CMER AM Program ranking table (table 3) in Appendix H of the FPHCP. They simply represent the fact that CMER does not have the ability to undertake the majority of the highest priority projects within the first 10 years since the FFR was adopted by the WA state legislature. For example, the six Type N projects listed in the first six rows in the above spreadsheet were all ranked by CMER as "high priority" in Table 3 of Appendix H (FPHCP 2005) yet only one is listed as "urgent" with three listed as "delayed". When cross referencing the CMER budget worksheet with the CMER Project Ranking list note that many other high ranking projects currently in the "delay" mode (e.g., Type N WQ/downstream effects, Fish Passage Effectiveness Monitoring Project).

Also worth noting is that unlike the CMER budget spreadsheet listed above, the 2006 CMER budget listed in Appendix H of the FPHCP (2005) does not show or account for the fact that CMER's budget runs a deficit three years from now based on a lack of support from the federal government. The FPHCP (2005) version in Appendix H shows the budget is flush through the year 2012 and does not account for all of the "delay" projects that have yet to be funded or started by CMER [see Expected Appropriation under Total Expenditures (Minus Delay Projects) above]

IER Forests & Fish Project Ranking 10-17-03

ectiveness/Validation Monitoring Programs & Projects	Scientific Uncertainty Total	Risk to Resource Total	Number Respondents	Average Scientific Uncertainty	Average Risk to Resource	Product	Rank
ype N Experimental Buffer Treatment	55	51	13	4.23	3.92	16.60	1
ype N Buffer Chara., Integrity and Function Proj.	53	47	13	4.08	3.62	14.74	2
oad Sub-Basin-Scale Effectiveness Monitoring	46	51	13	3.54	3.92	13.88	3
AA Detection/Relative Abundance Methodology Proj.	53	43	13	4.08	3.31	13.49	4
Type N WQ/downstream effects	52	42	13	4.00	3.23	12.92	5
ish Passage Effectiveness Monitoring Project	42	47	13	3.23	3.62	11.68	6
istorical, Sustainable, and Future Stand Conditions	48	41	13	3.69	3.15	11.64	7
uffer Integrity-Shade Effectiveness	43	37	12	3.58	3.08	11.05	8
lass Wasting Prescription-scale Effectiveness Mon.	43	43	13	3.31	3.31	10.94	9
ffectiveness of Unstable Landform Identification	41	43	13	3.15	3.31	10.43	1(
Eastside Type F Monitoring Add-on	40	41	13	3.08	3.15	9.70	1'
oad Surface Erosion Model Validation/Refinement	38	36	12	3.17	3.00	9.50	1:
ull Trout Overlay Temperature Project	41	39	13	3.15	3.00	9.46	1:
ype F Experimental Buffer Treatment	43	37	13	3.31	2.85	9.41	1.
listorical, Sustainable, and Future Stand Cond. Followup	42	32	12	3.50	2.67	9.33	1:
ype F Riparian Prescription Monitoring Project	38	40	13	2.92	3.08	8.99	1(
tatewide Forested Wetland Regeneration Pilot & Proj.	42	35	13	3.23	2.69	8.70	1'
ardwood Conversion Project	38	38	13	2.92	2.92	8.54	1!
Vetland Mitigation Effectiveness Project	40	36	13	3.08	2.77	8.52	1!
ype N Performance Target Validation	40	31	13	3.08	2.38	7.34	2(
ailed Frog Literature Review & Meta-analysis	39	31	13	3.00	2.38	7.15	2'
oad Prescription (Site-Scale) Effectiveness Mon.	32	37	13	2.46	2.85	7.01	2:
ffectiveness of Identifying RMAP Priority Fixes	31	38	13	2.38	2.92	6.97	2:
lass Wasting Buffer Integrity & Windthrow Assess.	35	33	13	2.69	2.54	6.83	2.
ype F Performance Target Validation	31	30	12	2.58	2.50	6.46	2!
unns & van Dykes Salamander	37	25	12	3.08	2.08	6.42	2(
WD Literature Review	35	30	13	2.69	2.31	6.21	2'
Vetland Management Zone Effectiveness Mon. Project	31	28	12	2.58	2.33	6.03	2!
lass Wasting Landscape-Scale Effect. Mon. Proj.	37	27	13	2.85	2.08	5.91	2!
Vetland/Stream Water Temperature Interactions	37	26	13	2.85	2.00	5.69	3(
WD Literature Review Followup Studies	34	28	13	2.62	2.15	5.63	3'
evelopment of Site-scale Road Mon. Field Protocols	31	29	13	2.38	2.23	5.32	3:
MZ Resample Project	34	25	13	2.62	1.92	5.03	3:
Vetland Hydrology Connectivity Project	34	24	13	2.62	1.85	4.83	3.
roundwater Conceptual Model	34	21	13	2.62	1.62	4.22	3!
ype N Classification	28	21	12	2.33	1.75	4.08	3(
hemical Application Monitoring Project	28	23	13	2.15	1.77	3.81	3'

IER Forests & Fish Project Ranking 10-17-03

Last Fish/Habitat Prediction Model Development	18	14	1.29	1
Last Fish/Habitat Prediction Model Update & Validation	26	14	1.86	2
SAA Sensitive Site Identification Methods	29	14	2.07	3
SAA Sensitive Sites Characterization	27	13	2.08	4
Landslide Hazard Zonation	31	14	2.21	5
Vulnerability of DS Landslides to Timber Harvest	31	14	2.21	5
DFC Trajectory Model Validation	32	14	2.29	7
Region. Unstable Landfrm ID (Map/Deep-Seated Screen)	32	14	2.29	7
DNR GIS Wetlands Data Layer	33	14	2.36	9
Annual/Seasonal Variability Project	34	14	2.43	10
DFC Target Validation	34	14	2.43	10
Landform Hazard Class. System & Mapping Protocols	35	14	2.50	12
Model ET Changes to DS Landslide Recharge Areas	35	14	2.50	12
Perennial Stream Survey (Full Statewide Project)	35	14	2.50	12
Shallow Rapid Landslide Screen for GIS	35	14	2.50	12
Bull Trout Habitat Prediction Models	36	14	2.57	16
Bull Trout Presence/Absence Protocols	36	14	2.57	16
Technical Guidelines for Geotechnical Reports	36	14	2.57	16
Hydrogeomorphic Wetland Classification System	37	14	2.64	19
Accuracy & Bias in Identification of Unstable Landforms	32	12	2.67	20
DFC-Aquatic Habitat	39	14	2.79	21

Comments to Compliance Monitoring (Section 3.5.5 in Response to Comments FEIS 2006)

The Services response to comments for this entire section read:

3.5.5 Compliance Monitoring

Some commenters were concerned about adequate compliance monitoring (referred to by some commenters as "implementation monitoring") in support of the adaptive management program. Several commenters associated "adequate" with sufficient funding. Others were concerned that an adequate monitoring plan had yet to be developed.

While compliance with regulations is a necessary prerequisite for many adaptive management studies, monitoring for compliance is primarily an enforcement responsibility. Nevertheless, the Services note that the FPHCP outlines the compliance assumptions and associated compliance monitoring while describing the essential link to the adaptive management program (See FPHCP Chapter 4a-3.1.3). Since the DEIS was published, the Forest Practices Board has adopted the "Guidelines for Adaptive Management Program" as Chapter 22 of the Forest Practices Board Manual. The Guidelines reinforce the connection between compliance monitoring and adaptive management by stating that "[t]he Department will design a compliance monitoring

2 program, and will conduct compliance monitoring to determine how well the forest
3 practice rules are being implemented on the ground. Compliance monitoring results will
4 be reported to the Forest Practices Board, to CMER through the Administrator, and to
5 others as directed by the board" (Forest Practices Board Manual, Section 22, Chapter 6.2;
6 FPHCP Appendix F). For further Compliance and Enforcement responses, see
7 subsection 3.11.
8 The Services consider the requirements for adequate funding of the compliance
9 monitoring program to be essential, as is funding for the entirety of the FPHCP (See the
10 Adaptive Management response, Adequate Funding, subsection 3.5.13).

The Services fail to recognize the critical link between compliance monitoring and the effectiveness and validation monitoring being conducted by CMER. Specifically, without compliance monitoring, that ideally should either preceed and/or take place as soon as effectiveness and validation monitoring begins, the Services and WDNR will not be able to confirm whether or not CMER's monitoring results are in response to the FPHCP rules or not (see my comments to the DEIS on compliance monitoring).

While the Services *"consider the requirements for adequate funding of the compliance monitoring program to be essential, as is funding for the entirety of the FPHCP (See the Adaptive Management response, Adequate Funding, subsection 3.5.13)"*. They fail to acknowledge that very little has actually been conducted since the FFR was adopted by the WA state legislature, and that CMER as never been involved with the planning process (see my comments to the DEIS on compliance monitoring).

Comments to Effectiveness and Validation Monitoring (Section 3.5.6 in Response to Comments FEIS 2006)

Here again the Services fail to acknowledge and adequately address the limitations of CMER to even begin scoping many of the "highest priority" projects by stating that they will be "evaluated early in the life of the plan". The Services response states:

27 The Services note that effectiveness monitoring will be conducted throughout the 50-year
28 duration of the FPHCP, with the highest priority monitoring issues being evaluated early
29 in the life of the plan. The TFW/FFR Policy Group and the Forest Practices Board will
30 consider monitoring results in light of existing performance targets and resource
31 objectives. Where performance targets and/or resource objectives are not being met, the
32 Forest Practices Board may decide to modify protection measures to improve their
33 effectiveness. Already, two monitoring projects (evaluation of DFC RMZ targets and
34 evaluation of perennial initiation point default basin sizes) have been completed and the
35 Forest Practices Board is considering modifying the Washington Forest Practices Rules
36 based on the results.

Their statement is inconsistent with the CMER Budget Proposal (6-29-05) that was approved by the FPB for year 2006, and the CMER Forest and Fish Project Ranking Table listed above. These tables clearly show that CMER has not been able to begin scoping many of the "highest priority monitoring issues" in the "early life of the plan".

At least not within the first seven years. The Services also incorrectly list both the "DFC RMZ targets and the evaluation of the perennial initiation point default basin sizes" as effectiveness/validation monitoring when in fact they are "rule tool" studies. Validating existing rule tools which determine how the FPHCP rules are applied on the ground is not the same as validating whether or not specific prescriptions are meeting resource objectives and performance targets. Again, the Services would be well served by reading the CMER Work Plan in sufficient detail to better inform their response(s) at least to the extent that they more accurately reflect the organization, structure, and purpose of the FPHCP Adaptive Management Program.

Comments to Intensive Monitoring (Section 3.5.8 in Response to Comments FEIS 2006)

Here again the Services response is indicative of the fact that they are out of touch with the limitations currently faced by CMER in advancing high priority projects. The Services response states:

37 The goal of intensive monitoring is to determine if implementation of the full range of
38 FPHCP protection measures is preventing cumulative watershed effects. While other
39 monitoring components evaluate individual protection measures and performance targets,
40 intensive monitoring will evaluate the integration of multiple protection measures to
41 assess their effects on instream conditions at the watershed scale. While the intensive
42 monitoring component of adaptive management is still under development, it is likely
1 that multiple watersheds throughout the State will be monitored so that variations in
2 watershed conditions can be addressed.

The intensive watershed monitoring group has met infrequently, and CMER has held one afternoon session, but they have yet to scope out a meaningful approach to intensive watershed monitoring to the extent that is required under the FPHCP. The IMW group has determined that the costs associated with monitoring just one watershed in beyond CMER's budget and consequently, is currently looking for "outside" funds to help support this project. The Services statement that "*it is likely that multiple watersheds throughout the State will be monitored so that variations in watershed conditions can be addressed.*" is completely false and unsubstantiated. This is yet another example of the Services repeated attempts to defer valid criticisms to CMER's Work Plan without bothering to read it.

Comments to Timely Recommendations (Section 3.5.11 in Response to Comments FEIS 2006)

The Services response does not adequately address the structural problems inherent in adopting an AMP of this size, complexity, and scope. Here they finally address the timeliness issue faced by CMER's inability to complete the myriad projects dumped into the FPHCP AMP. The services response states:

15 The Services are aware that, prior to publication of the DEIS, no research had advanced
16 through the scientific review procedures. However, since the DEIS was published, the
17 first two research projects (basal area of reference stand conditions and the land area
18 defining a perennial and seasonal stream initiation point) have progressed through the
19 process to the point at which they have been reviewed by the Scientific Review
20 Committee and forwarded to the TFW/FFR Policy Group (See FPHCP 4a-4.1; WAC
21 222-12-45; FPHCP Appendix F). For the two studies mentioned above, the TFW/FFR
22 Policy Group has complied with the adopted schedule to develop recommendations for
23 the Forest Practices Board.
24 The Services note the concern of commenters that decisions be made on a timely basis,
25 but existing experience with the adaptive management program suggests that the majority
26 of time devoted to an issue has been used by the scientific researchers and peer reviewers,
27 not the TFW/FFR Policy Group or other decision-makers. These policy decision-makers
28 have, thus far, complied with the existing schedule for decision-making.
29 The Services believe sufficient information exists to determine whether the schedule for
30 decision-making is appropriate under ESA Sections 10 and 7, and sufficient information
31 exists to establish a reasonable expectation about whether the TFW/FFR Policy Group
32 will formulate its recommendations to the Forest Practices Board in accordance with the
33 schedule.

First, one of the two studied (DFC) cited above was suppose to be completed within the first two years following the FFR (1999). The other (Type N Demarcation) was also listed as a high priority "rule tool" study and was suppose to be completed along the same time frame precisely because both studies inform two rules, based on very little science, that determine how the FPHCP prescriptions get implemented on the ground. Seven years have passed since the FFR and the WDNR continues to operate under these rules while the FPB considers what action to take, if any, this coming year (2006)

The Services note that *"the majority of time devoted to an issue has been used by the scientific researchers and peer reviewers, not the TFW/FFR Policy Group or other decision-makers."* is a blatant attempt to shift the responsibility of those very decision-makers, who negotiated the FPHCP, to the CMER committee who is simply responding to an unrealistic, overloaded, and highly complex Adaptive Management Program. Those Policy decision-makers were the ones responsible for substituting "experimental design" for more protective upfront conservation measures when there was an impasse during the FFR negotiations (see my comments to the DEIS on AMP Structural Problems in the attached Addendum). Their actions during negotiation directly resulted in the creation of an AMP with multiple compliance, effectiveness, validation, extensive, and intensive monitoring projects covering 10 million acres of private forestland in Washington State. There or over 50 different combinations of FPHCP riparian prescriptions alone that would challenge any group of scientists to realistically monitor under the current "budget and human resource limitations" faced by CMER (Appendix H, FPHCP 2005).

As an active CMER member it is both insulting and very disingenuous for TFW/FFR Policy group and other FFR "decision-makers" to now attempt to shirk their responsibility and the consequences of concocting such a highly experimental FPHCP onto CMER's shoulders. CMER and SAG (scientific advisory group) members and staff consist of a "volunteer" group of dedicated scientists and professionals that attempt to

balance their FPHCP AMP workload with all of their non-FFR responsibilities within their agencies and organizations.

Policy's attempt to simply wash their hands of the AMP mess they created during FFR negotiations is disgraceful and does a disservice to all of those dedicated to trying to make it work. The issues related to timeliness of AMP reports and CMER's productivity are a direct result of political decisions that abused the scientific process by accepting an over-reliance on experimental design as a substitute for more adequate upfront conservation measures.

Comments to Adequate Funding (Section 3.5.13 in Response to Comments FEIS 2006)

The trend that the Services response to comments are inadequate and inconsistent with the CMER Work Plan and budget hold true here as well. Concerning AMP funding the Services state:

38 The Services believe that funding the implementation of the entire FPHCP is important.
39 In fact, under ESA Section 10, the Services must find that "the applicant will ensure that
40 adequate funding for the plan will be provided" (ESA Section 10(a)(1)(b)(iii)). The
41 determination as to adequate funding will be documented in the statement of findings
42 documents issued by the Services should ITPs under Section 10 be issued. The Services
43 address all comments related to adequate funding here. They do so in the context of
44 adaptive management, although the response to adequacy of funding would be applicable

1 to each and all elements of the FPHCP, including those related to administration of the
2 Forest Practices Regulatory Program.
3 The Services interpret the language in ESA Section 10 to require that they have a high
4 degree of confidence that funding adequate to implement the plan will be made available
5 when and as it is necessary. While this finding requires familiarity with the costs of
6 implementation, the Services do not believe it requires a specific budget for the term of
7 the plan, particularly for a long-term plan. It is reasonable to anticipate the costs of
8 administration of the Forest Practices Regulatory Program in the near-term, and the
9 FPHCP has been modified to include information about recent expenditures related to the
10 Forest Practices Regulatory Program of the State of Washington. Over the long term,
11 however, costs become more speculative. Similarly, estimates of near-term costs of the
12 adaptive management program to address known research priorities may be reasonably
13 foreseeable, but longer-term costs associated with unknown research needs are not. The
14 Services do not believe the provision in Section 10 requires that specific funds for
15 implementation be identified at the outset, only a determination that "adequate funding
16 for the plan will be provided."

In referencing the CMER Budget Proposal (6-29-05) listed above, there are clearly inconsistencies between the Services statements and the projected costs of CMER projects.

First, CMER as has started approximately one third of the projects that are directly linked to Schedules L-1 and L-2 listing the resource objectives and performance targets required to be met by the FPHCP (Appendix H). The most current CMER budget shows that completing those projects will cost approximately 30 million dollars. Under the current budget scenario these projects run into a deficit beginning in 2009 in response to the elimination of federal financial support. In the "near-term" CMER will fail to complete the projects it has started with out a supplemental funding source.

The services statement that "*Over the long term, however, costs become more speculative. Similarly, estimates of near-term costs of the adaptive management program to address known research priorities may be reasonably foreseeable, but longer-term costs associated with unknown research needs are not.*" clearly doesn't address even the short-term budget shortfalls faced by the AMP. Given the costs associated with anticipating the completion of approximately on third of Schedule L-1 and L-2 related projects, its very reasonable to assume that the long-term costs will approach, and may very well exceed 100 million dollars. This is based on the fact that many of the long-term monitoring projects (extensive and effectiveness) linked to resource objectives and performance targets have yet to begin. The only "speculation" involved will be linked to unforeseeable additional studies that are borne out of the existing studies linked to Schedules L-1 and L-2. This figure (100 million $) is not unrealistic. Budget cuts in the form of project cuts will directly equate to a reduction the AMP's ability to ascertain with confidence whether or not the resource objectives and performance targets under the FPHCP are being achieved.

ADDENDUM

Chris Mendoza
2nd Round of Comments on FPHCP Adaptive Management Program.

The FPHCP Adaptive Management Program is over reliant on experimental design in response to high scientific uncertainty and risk associated with FFR Riparian Prescriptions

Habitat Conservation Plans are by design responsible for protecting species listed in the plan to the "maximum extent practicable", particularly in cases where there is high scientific uncertainty underlying a rule or regulation. In an addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process (Federal Register, Vol 65, No. 106, 2000) NOAA and the USFWS state that:

"The Services agree that adaptive management should not be used in place of developing good upfront conservation measures or to postpone addressing difficult issues. However, adaptive management may be necessary to craft a framework for addressing uncertainty in the operating conservation program to ensure that the measures fulfill the biological goals and objectives of an HCP."

The above federal requirement was not adhered to in the FPHCP which relies heavily on experimental design in place of "upfront conservation measures" in crafting riparian prescriptions designed to protect listed aquatic species. This is most evident in the CMER (Cooperative Monitoring, Evaluation and Research Committee) Work Plan which is tasked with implementing the FPHCP Adaptive Management Program (FPHCP, Appendix H, 2004). The CMER Work Plan describes in detail their process for ranking and prioritizing AM research programs and projects designed to test key assumptions built into specific FFR rules and regulations (FPHCP, Appendix H, 2004). Under the "Effectiveness/Validation and Extensive Monitoring Program Ranking" section of the CMER Work Plan, CMER assesses the "merit" of each program by asking two questions:

1. *How certain are we of the science and/or assumptions underlying the rule?*
2. *How much risk is there to the protected resource if the science and/or assumptions underlying the rule are incorrect?*

These key questions concerning the merits of the science underlying assumptions of a forest practices rule, intended to protect listed species under the FPHCP, should have been addressed during initial FRR negotiations well in advance of the public comment period. Putting them off "postpones addressing difficult issues" and stacking them into an increasingly large Adaptive Management pile in the absence of supporting science avoids "developing good upfront conservation". Habitat Conservation Plans by definition should be conservative (conservation minded) to the extent that they provide adequate protections to listed species that mitigates for large gaps in scientific knowledge underlying the forest practice rules governing habitat protection (Walters 1997). The FPHCP takes the opposite approach by minimizing riparian habitat protections in the face of scientific uncertainty in hopes that AM research and monitoring will answer the "difficult questions" that were not addressed on the front end of the FFR negotiations. The CMER program/project ranking process goes on to describe the details of how to deal with various levels of scientific uncertainty and associated risks to listed species underlying FPHCP rules as a direct results of shortcomings in FFR negotiations (FPHCP, Appendix H, 2004).

"These questions (above) *were chosen to rank programs because uncertainties and gaps exist in the scientific foundation for the FFR and the underlying assumptions about risks to aquatic resources. CMER was charged with reducing these uncertainties through effectiveness and validation monitoring and research and then recommending modifications to the rules as necessary through the adaptive management process. Uncertainty is a measure of confidence in the science underlying a rule, including the scientific relationships providing the conceptual foundation for the rule, the assumptions incorporated into the prescription, or the response to the prescription when it is applied on the ground. High uncertainty (low certainty) indicates that little is known about the underlying science and the rule is likely based on speculation and poorly informed assumptions. It may also indicate that the prescription treatment is untested, and the performance under field conditions is unknown. Low uncertainty (high certainty) indicates that the science underlying the rule is well known and accepted, or that the prescription (or similar treatments) has already been evaluated under similar conditions.*

Risk is a measure of the potential for detrimentally impacting aquatic resources and thus undermining the intent of the FFR goals, e.g. harvestable fish populations, stream associated amphibians, and water quality. A high-risk assignment indicates the rule component under study has a greater potential to alter the resource because of its high magnitude, frequency, and/or direct linkage to the resource. A low risk assignment indicates that the rule component has a lesser potential to alter the resource because of its low magnitude, frequency, and/or indirect linkage to the resource."

This is hardly a recipe for providing "good upfront conservation measures" in the absence of scientific knowledge underlying a rule, particularly when there is a measure of high risk with "the potential for detrimentally impacting aquatic resources and thus undermining the intent of FFR goals...". According to the Federal Register (Vol. 65, No. 106, 2000), one cannot substitute a heavy reliance on experimental design for good upfront conservation measures.

Not surprisingly, as a result of the CMER ranking process several key FFR forest practices rules (previously negotiated by FFR stakeholders) are associated with AM research programs that were found to be of "high risk" and "high uncertainty" as prioritized and listed in Table 25. of Appendix H of the FPHCP (2004). Individual research and monitoring projects fall into specific "programs" that are associated with Type N streams, Type F streams, roads, mass wasting, butt trout, wetlands, Extensive and Intensive monitoring, and rule tools . The (priority) programs in the upper half of Table 25. are represented by Type N (non-fish bearing) and Type F (fish-bearing) streams, roads, mass wasting, bull trout and wetlands.

The FFR Type N stream buffers are an excellent example of the FPHCP relying on highly experimental riparian prescriptions based on very little science in place of adequate conservation measures.

Table 25. CMER rankings for effectiveness/validation programs.

Program Title	Overall Ranking	Uncertainty		Risk	
		Mean	Rank	Mean	Rank
Effectiveness/Validation Programs					
Type N Buffer Characteristics, Integrity Function	1	4.4	1	3.9	1
Eastside Type F Desired Future Range and Target	2	4.2	2	3.8	2
Type N Amphibian Response	3	4.2	2	3.7	3
Road Basin-scale Effectiveness Monitoring	4	3.4	5	3.4	4
Type F Statewide Prescription Monitoring	5	3.2	7	3.1	6
Mass Wasting Effectiveness Monitoring	6	3.2	6	2.9	8
Eastside (BTO) Temperature	7	3.0	9	3.2	5
Wetlands Revegetation Effectiveness	8	3.5	4	2.7	11
Road Site-scale Effectiveness Monitoring	9	2.6	14	3.1	6
Hardwood Conversion	10	3.0	8	2.6	12
Wetland Mitigation	11	2.8	11	2.7	10
Fish Passage Effectiveness Monitoring	12	2.6	14	2.9	9
Wildlife Program	13	2.9	10	2.4	14
Wetland Management Zone Effectiveness Mon.	14	2.8	12	2.5	13
CMZ Effectiveness Monitoring	15	2.7	13	2.1	15
Forest Chemicals	16	2.0	16	2.1	16
Extensive Trend Monitoring Programs					
Extensive Riparian Monitoring	1	3.5	2	3.5	1
Extensive Mass Wasting Monitoring	2	3.7	1	2.9	3
Extensive Fish Passage Monitoring	3	3.1	3	3.1	2

Examples of Upfront Habitat Conservation Measures on Type Np (perennial non-fish bearing) waters required by other Federally Approved HCP Riparian Prescriptions.

One of the most significant differences between the FPHCP and other federally approved HCPs with similar aquatic species lists is the amount of riparian protections provided for perennial flowing non-fish bearing streams (Type Np). Both the DNR HCP (1996) and the Simpson Timber Company (now Green Diamond) HCP (2000) require riparian buffers along the entire length of the Type Np channel network. These channel types are most often located in watershed headwaters and directly contribute to fish bearing waters. Headwater areas are most susceptible to mass wasting events, road failures, and increases in temperature and sediment supply which impact both stream associated amphibians occupying them and adjacent downstream fish bearing waters (Washington Watershed Analysis Manual 1995, WDNR HCP 1996, Simpson Timber Co. HCP 2000).

The DNR HCP (1996) and the Simpson HCP (2000) require 100 ft. and 65 ft. riparian buffers, respectively, along the entire length of the Type Np headwater channel network. These requirements were largely based on extensive research conducted by CMER under the TFW process in response to Washington Watershed Analysis. Much of the TFW and other peer reviewed research informed DNR and the Services of the importance of fully protecting non-fish bearing headwater streams, and adjacent unstable slopes, to mitigate for stream associated amphibians and downstream impacts to fish-bearing waters. Both HCPs reference reports including but not limited to: Swanson et al. 1976; Swanston and Swanson 1976; Nussbaum 1977; Swanson et al. 1982; Swanson et al., 1987; Swanson and Lienkaemper, 1978; Swanston and Swanson, 1976; Benda and Cundy 1990; *Montgomery and Buffington, 1993; *O'Conner and Harr, 1994; *Coho and Burges, 1994; *Johnson 1991; Ralph et al. 1994; Lamberti et al. 1991; *Coho and Burges, 1991; Hass 1996; Montgomery et al., 1998; Hays 1998; Nijhuis and Kaplan 1998; *Soicher 1999; Adams and Bury 2002; *Chesney 2000; Gresswell and May, 2000; Potts and Anderson, 1990; Prichard et al., 1998; Simpson Timber Co. 2000; *WDNR 1996; *WDNR 2001; *Washington Watershed Analysis Manual 1995; Kiffney et al., 2000; McHenry et al., 1998; Benda et al., 2003.

* Indicates CMER TFW documents housed at both the NWIFC and DNR. These documents are also available on the internet at: (http//.www.dnr.wa.gov/forestpractices/adaptivemanagement/cmer/publications/pubs.htm l.). For details see technical comments to Chapter 4 (Rationale for Riparian Conservation Strategy) of the Draft FPHCP (2004).

Unlike the FPHCP, the DNR and Simpson HCPs provided upfront habitat conservation measures for headwater streams based on two key factors:

1) The best available science underlying the proposed riparian rules strongly indicated that full protection of headwater streams (Type Np) was necessary to mitigate for, and minimize impacts to stream associated amphibians occupying

the Type Np channel network, and the potential downstream impacts to salmon bearing rivers and streams.

2) The high "risk" to aquatic species associated with a high level of "uncertainty" (i.e., the science underlying the proposed rule) in providing anything less for riparian buffers on Type Np channels was unacceptable to both NOAA and the USFWS for the purposes of approving an Incidental Take Permit under both HCPs (DNR 1996, Simpson Timber Co. 2000).

By comparison, the FPHCP provides protection of ½ the length of the Type Np channel network of that provided by both the DNR and Simpson HCPs. There is presently no evidence to suggest that providing riparian buffers along only 50% of the total length of Type Np waters will mitigate for, and minimize impacts to listed fish and amphibian species by providing adequate riparian protections. This fact is born out in the CMER ranking process (which weighed scientific uncertainty with risk to aquatic resources) that resulted in Type N program/projects, and other critical research programs making the top of the list in Table 25. Instead of providing good upfront conservation measures in the absence of scientific knowledge underlying a rule, the FPHCP defers critical questions regarding risk associated with *inadequate* riparian protections to "experimental design" through the AM program. This type of risk deferment is done repeatedly in the FPHCP as evidenced by the projects listed in Table 25. of the CMER Work Plan (FPHCP, Appendix H, 2004) and is a poor substitute for more protective upfront conservation measures.

Equally disturbing is the appearance of DNR's selective exclusion of TFW research (*) that specifically addresses the importance of fully protecting the Type Np channel network in order to minimize forest practices impacts to fish and amphibian species. This type of selective exclusion of non-supportive research (much of which was conducted in cooperation with, and is in fact housed at DNR) extends to Type F riparian protections as well and is addressed in more detail in comments to their Riparian Strategy (Chapter 4, Draft FPHCP).

Below are questions pertaining to mitigating impacts for providing 50% riparian coverage of Type Np channels under the FPHCP.

1) How is the FPHCP planning to mitigate for the loss of recruitment of LWD covering 50% of the Type Np channel network on FFR lands where no riparian buffers are required?
2) How, and to what extent, will the loss of LWD recruitment from 50% of Type Np headwater channels affect the rate and distribution of mass wasting events on FFR lands?
3) How will this rate of mass wasting affect adjacent downstream fish populations listed in the FPHCP?
4) What rationale is being proposed by the FPHCP to mitigate for the loss in recruitment of LWD from Type Np channels covering 50% of their length as adequate for insuring the long-term viability of listed fish and amphibians?

The FPHCP Adaptive Management Program is not capable of fully implementing research and monitoring projects (through experimental design) as outlined in Schedules L-1 and L-2.

As a direct result of over reliance on experimental design to answer important questions regarding scientific uncertainty and associated risk to aquatic species, the FPHCP AM program has built up a very ambitious research and monitoring program under the charge of CMER. The FPHCP consists of over 50 combinations of riparian prescriptions on Type S, F, and N waters (WAC 222-030-021,022,023) that require various levels of research and monitoring under the AM program as outlined in Schedules L-1 and L-2. According to the CMER Work Plan, additional monitoring is required of unstable slopes, roads, fish passage, wetlands, pesticides and wildlife (Appendix H, FPHCP).

Schedule L-1 addresses key questions designed to answer whether or not the FPHCP is meeting previously agreed upon Resource Objectives and Performance Targets designed to provide adequate protection and conservation of listed aquatic species. Schedule L-2 lists specific projects associated with the issues identified for adaptive management research in the Forest and Fish Report. The CMER Work Plan (Appendix H, FPHCP) was initially constructed to account for all the monitoring projects outlined in both of these schedules (L-1, L-2) as they were an integral part of the FFR "deal". Due to the large number and broad scope of individual research and monitoring projects, the complexity of the FPHCP riparian prescriptions, and the highly variable and relatively large landscape the rules are being applied to (10 million acres of Washington State), CMER has opted to categorize different projects into "Rule Groups" based on program type. Under Rule Group Structure and Definition in the CMER Work Plan (Appendix H, FPHCP) CMER defined rule groups as:

A rule group is a set of forest practices rules relating either to a particular resource, such as wetlands, or fish-bearing streams, or to a particular type of forest practice, such as road construction and maintenance. The rule groups are organized along the lines of the FFR appendices, including:

1. *Riparian Strategy (FFR, Appendix B) which includes five sub-groups:*
    a. *Stream Typing*
    b. *Type N Streams*
    c. *Type F streams*
    d. *Bull trout*
    e. *Channel Migration Zones (CMZ)*
2. *Unstable Slopes (FFR, Appendix C)*
3. *Roads (FFR, Appendix D)*
4. *Fish Passage (included in FFR, Appendix D, Roads)*
5. *Pesticides (FFR, Appendix E)*
6. *Wetland Protection (FFR, Appendix F)*
7. *Wildlife*

Individual research and monitoring projects related to schedules L-1 and L-2 fall under one of the programs listed in Table 25. Individual projects are also broken down on a spreadsheet for budget forecast purposes and prioritization (CMER Forest & Fish Budget Funding Options April 21, 2005). This spreadsheet is updated monthly by the FFR Adaptive Management Administrator and serves as a reference to CMER activities as they relate to AM project status, priority, and costs through year 2010.

The CMER spreadsheet indicates that many key AM research and monitoring projects that rely on experimental design as a substitute for upfront conservation measures have either been delayed or under funded (CMER Funding Options April 21, 2005). Of particular concern are the individual projects listed under the Type N Buffer Characteristics, Integrity and Function Program which was ranked No. 1 by CMER in Table 25. due to a high level of uncertainty in the science underlying related FFR rules, and the high level of risk "for detrimentally impacting aquatic resources". Of the six projects falling under this program, all related to headwater streams, only one has been prioritized "urgent". Four have been "delayed" with no action, and one is relegated to "second" (just below Urgent) pending additional review by CMER and potential budget shortfalls. This isn't very promising for a Rule Group Program that was ranked No. 1 by CMER (Table 25) based on the high level of uncertainty and risk associated with FFR rules guiding riparian prescriptions. In the absence of upfront conservation measures, delaying AM projects which already rely heavily on experimental design exposes aquatic species to additional risks on top of those already incurred through deferment of more comprehensive habitat conservation measures.

In moving down the CMER Budget Spreadsheet (April 2005) and cross referencing it with the CMER program ranking list (Table 25, Appendix H, FPHCP) this disturbing trend is apparent throughout all of the Effectives and Validation Monitoring Programs and projects. Eastside Riparian Type F (rank No. 2 for high scientific uncertainty and risk to the resource) has one of three projects listed as urgent; Type N Amphibian Response (rank No. 3) has 3 of 7 projects listed as second; Roads sub-basin Scale Effectiveness Monitoring (rank No. 4) has 1 project completed and 1 delayed; Type F Statewide Prescription Monitoring (rank No. 5) has 3 of 4 projects delayed; Mass Wasting Effectiveness Monitoring (rank No. 6) has 2 of 4 projects delayed; Bull Trout Overlay Temperature (rank No. 7) has 2 of 4 projects delayed; Forested Wetlands Revegetation Projects (rank No. 8) has 2 of 4 projects delayed; Wetland Mitigation delayed; Wetland Management Zone Effectiveness Monitoring delayed; Extensive Wetlands Trend Monitoring delayed; CMZ Effectiveness Monitoring delayed; Alternate Plan Assessment delayed; and similar results continue down the list. Even some Rule Tool projects, which by definition are designed to help validate and implement the current FPHCP rules and regulations on the ground, have been delayed (e.g. DFC Trajectory Model Validation and DFC Aquatic Habitat projects).

The above list represents the affect of state and federal budget shortfalls and CMER's inability to implement an ambitious Adaptive Management program due to limited staff, qualified project managers, budget, and other resources required of an AM program of this magnitude. *All* of the research and monitoring projects in the CMER work plan and

budget need to be fully funded and implemented as they were derived from Schedules L-1 and L-2 which explicitly link FFR Resource Objectives and Performance Targets to specific projects associated with adaptive management research in the Forest and Fish Report. In other words, they were all part of the "deal".

Given that the FPHCP is "heavy" on experimental design and "light" on establishing good upfront conservation measures, it's critical that all AM research and monitoring projects get fully implemented on schedule to avoid exposing listed aquatic species to additional risk. Unfortunately, that has not been the case thus far. In Chapter 2 of the Draft EIS (Analysis of Alternatives, 2004), the FPHCP Alternative (2) states that Adaptive Management under this scenario will lead to a "robust and functionally effective program". The analysis further states:

Under Alternative 2, the adaptive management program would be in the rules as described in WAC 222-12-045 and summarized below. The adaptive management program is more fully described in the FPHCP. The FPHCP addresses the consistency between the State's adaptive management program and Federal ESA requirements. Receiving ESA take authorization through Section 10 of the ESA would provide the anticipated incentive and opportunity for the adaptive management program to be a robust and functionally effective program. FFR participants voluntarily provide technical support to the adaptive management process, as well as forest sites and logistical support for on-going research. Broad stakeholder support and participation in the FFR collaboration would ensure the program has sufficient resources to staff and carryout the anticipated research and monitoring effort. Under this alternative, it is expected that the program would continue to receive public funding as well as broad support and direct participation by stakeholders. The resulting adaptive management program would address, as anticipated, scientific uncertainty and the degree to which the current Washington Forests Practices Rules meet established resource goals and objectives.

The current status of the FPHCP AM program as outlined in the CMER Budget and Work Plan demonstrates the failure of Alternative 2 in meeting anticipated program goals. The above statement also contradicts language in the FPHCP (Appendix H) for setting program priorities under the CMER work plan which directly addresses the limitation of the FFR Adaptive Management program. In outlining the AM program ranking process the CMER Action Plan states:

"The first step in the prioritization process was to rank the relative importance of proposed programs in meeting FFR goals and objectives in order to focus CMER resources and effort on critical areas. This is an important step because over the near-term the proposed research and monitoring projects exceed the availability of funding and the capabilities of human resources."

This last sentence captures one of the main problems inherent in attempting to implement an AM program of this scale (covering 10 million acres) that is over-reliant on experimental design to answer key questions pertaining to scientific uncertainties and associated aquatic resource risk. As "high risk/low certainty" projects continue to get delayed due to unforeseen funding shortages directly effecting AM program resources and personnel constraints, listed aquatic species are put at even greater risk to

"detrimental impacts" that could "undermine the intent of FFR goals" (FPHCP, Appendix H, 2004).

Summary and Conclusions

The FPHCP Adaptive Management Program is over reliant on experimental design in response to high scientific uncertainty, and associated risk to listed aquatic species, as a direct result of FFR negotiations that failed to provide better upfront conservation measures when faced with difficult issues. This is evidenced by the CMER research and monitoring program ranking process (2003) which clearly demonstrates that several key FPHCP forest practice rules regulating riparian protections were based on "speculation and poorly informed assumptions" that places listed aquatic species at unnecessary risk.

Other HCPs in Washington State (DNR 1996, Simpson 2000) were approved under conditions by NOAA and the USFWS that required conservations measures that were based on the best available science, and protected listed species to the maximum extent practicable. In the case of headwater stream (Type Np) riparian protections, the FPHCP falls well short (50%) of the standard (100%) previously set by NOAA and the USFWS as conditions for approval of incidental take permits for headwater amphibian species and to mitigate for impacts to downstream fish bearing waters. Moreover, the FPHCP ignores the breadth of scientific literature generated by the CMER TFW process, with the cooperation of DNR, underpinning the rationale for providing *full* headwater stream protections in order to mitigate for harvest management impacts to amphibians and downstream fish bearing streams. There is very high uncertainty, and a general absence in the literature, of any science underlying the rationale for providing only 50% protection of headwater streams under the Draft FPHCP.

To date CMER has been unable to implement the AM program as envisioned by the Forest and Fish Agreement because the "proposed research and monitoring projects exceed the availability of funding and the capabilities of human resources." (CMER work plan, Appendix H, FPHCP). This is also a direct result of the complexity of the rules regulating over 50 combinations of riparian prescriptions, and the FPHCP's over-reliance on experimental design to answer critical questions regarding aquatic species protection. Many of the important research and monitoring projects that CMER is charged with developing have been delayed due to lack of funding and resources (CMER Budget and Funding Options, 2005). All of these projects are listed in Schedules L-1 and L-2 of the FPHCP which link specific research and monitoring questions to FPHCP performance targets and resource objectives. Failure to fully fund and implement *all* of these projects can be viewed as failure to uphold the Forest and Fish Agreement.

Most importantly, since the FPHCP heavily relies on experimental design as a substitute for establishing upfront conservation measures, aquatic species are already at risk of becoming "detrimentally impacted" by current forest practices under the proposed HCP. Further delay of AM research and monitoring critical to their survival and long-term viability places listed aquatic species at additional risk to broad scale extirpation under an already risky plan.

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Critical Areas Calculation (Section 3.6.6, FEIS 2006)

The Services comments on Critical Areas Calculations (CACs) to my initial comments in the DEIS (2005) do not adequately address the fatal flaws in the methods they used to calculate Critical Areas for both the Minimal Effects Strategy and the FPHCP for the purposes of estimating "take" under the proposed HCP. Rather, their response reinforces my argument that CACs used in the FPHCP were artificially inflated by taking undue credit for the full width of FFR RMZs including the "outer zone" which is essentially a clear cut with between 5-20 trees/acre.

Their response specifically states that:

In response, the critical area calculations in the FPHCP Critical Areas assessment are not 17 based on overestimates of RMZ width by site class. Tables 4.2 through 4.7 in the FPHCP 18 list RMZ widths by site class, as required by the Washington Forest Practices Rules. The 19 critical area calculations are based on these widths. The commenter may be equating the 20 term "RMZ" with "no-harvest buffer." Nowhere in the FPHCP are Type S and F RMZs 21 described as no-harvest zones. Sections 4b-3.1.1 and 4b-3.2.1 of the FPHCP describe 22 RMZ requirements for Type S and F waters in detail. These descriptions clearly indicate 23 that harvesting is allowed in at least one (outer) and sometimes two (outer and inner) of 24 the three zones that comprise the RMZ.

The fact that FPHCP RMZs are *not* "no-harvest buffers" illustrates my point perfectly. Recall that the Minimal Effects Strategy (MES) *does* employ no-harvest buffers along both Type F waters and Type Np waters throughout the entire channel network when calculating Critical Areas for Minimal Effects. The FPHCP specifically states that:

"Estimating take for purposes of the FPHCP focuses on the number of habitat acres affected by the plan. The approach involves developing a hypothetical management strategy that it is assumed would 1) have minimal effects on species covered by the plan, and 2) result in very low levels of take. This "minimal effects" strategy serves as a baseline for evaluating and comparing management under the FPHCP. Differences between the minimal effects and FPHCP strategies are compared both quantitatively, in terms of the number of habitat acres affected, and qualitatively, in terms of the expected effects of implementing certain site- and watershed-scale protection measures."

And that:

The minimal effects strategy defines and protects critical areas as follows:

1) Fish-bearing (Type S and Type F) waters receive protection from channel migration zones and 250-year site index riparian management zones. CMZs are defined in accordance with forest practices rules. RMZs are established along the entire length of the fish-bearing network. No management activity is allowed within CMZs and RMZs under the minimal effects strategy.

2) Non-fish-bearing perennial (Type Np) waters receive protection from 100-year site index riparian management zones. RMZs are established along the entire length of the non-fish-bearing perennial network. No management activity is allowed within RMZs under the minimal effects strategy.

If the Minimal Effects Strategy "*serves as a baseline for evaluating and comparing management under the FPHCP*" for estimating take and no management activity is allowed on Fish-bearing (Type S and F) and non-fish bearing streams (Type Np), how can one rationalize comparing (quantitatively) the FPHCP CACs that *do* allow extensive management in the RMZs to the extent that the "outer zone" is essentially non-existent? Since direct comparison of the CACs for the MES and the FPHCP are based on total acres of riparian areas (and unstable slopes which were not addressed), you cannot count acres of trees that clearly do not exist on the ground. That's clearly artificial inflation by quantifying a resource (in this case trees) that quite simply does not exist. The best illustration of this is to view aerial photos of "heavily managed" FPHCP RMZ widths (the outer zone) that the Services are taking credit for in their CACs, and compare them to riparian zone widths in the Minimal Effects Strategy with "no harvest". The picture is pretty clear.

A realistic comparison of the MES and FPHCP CACs for estimating take should either compare no harvest areas for both, or similarly managed harvest areas for both, but not compare two completely different riparian strategies (clear cut vs. no harvest).

The Services go on to rationalize their CAC comparisons for the purpose of estimating "take" under Section 3.6.3 "Riparian Buffers" (FEIS 2006) the Services respond:

Although RMZ
36 outer zones are seldom treated as no-harvest areas, the leave tree requirements together
37 with the other protection measures for these areas are designed to provide ecological
38 functions important to the creation and maintenance of habitat for covered species.
39 Therefore, it is appropriate to include the full RMZ width, including both managed and
40 unmanaged zones, as part of the critical area-based calculation of take.

This is an extreme understatement given that the "outer zone" is *never* left unmanaged and in fact heavily managed to the extent that only 5-20 trees/acre are required as leave trees. Again, it's essentially a clear cut.

The Services attempt to equate ecological functions of a heavily managed (clear cut) FPHCP riparian "outer zone" with an equal buffer width of a "no-harvest" Minimal Effects riparian zone is completely unsubstantiated in the scientific literature. Using their same line of reasoning, one could state that a clear cut with a minimum number of wildlife and ground retention trees (a.k.a. WRTs and GRTs) is equivalent in ecological functions as an unharvested forest to upland species. It simply doesn't work for quantification purposes or comparing ecological functions and the Services have failed to present any supportive literature substantiating the merits of using this type of method for quantifying CACs for the purpose of estimating "take" under the ESA.

The Services did not attempt to respond to how the results of the CMER DFC study (Shuett-Hames et al. 2003) could potentially affect the CACs regarding Site Class. Specifically, my comments to the DEIS stating:

1. DNR's statewide maps depicting Site Class are non representative of true field Site Class as they were found to underestimate field Site Class 59% of the time (Schuett-Hames et al. 2003)

Concerning my other two comments on the use of DNR's water typing system for calculating CACs:

2. The DNR interim water typing system is not a "reasonable surrogate for the permanent water typing system still under development." (Cole et al. 2003, Palmquist 2003, Pleus and Goodman 2003, Cupp 2001, Cupp 2004)

3. The upper extent and distribution of the Type Np (DNR Type 4) channel network in both eastern and western Washington is much more expansive than the DNR interim water typing maps depict (Palmquist 2003, Pleus and Goodman 2003, Cole et al. 2003, Cupp 2001, Cupp 2004).

The Services response to #2. (3.6.6 Critical Areas Calculations, FEIS 2006):

25 The Critical Areas assessment used the same water type lengths reported in the DEIS.
26 Rather than using the DNR HYDRO layer, the DEIS used GIS technology to model a
27 new hydro layer based on the current interim water typing rules. For the non-fish-bearing
28 portion of the channel network (i.e., Type Np and Type Ns waters), the modeling used
29 the default basin sizes cited in the Washington Forest Practices Rules as a means of
30 identifying the upstream extent of perennial flow (i.e., the Type Np/Ns break). While the
31 default basin sizes are only used to type waters when the Type Np/Ns break cannot be
32 reliably identified using field indicators, they represented the only quantitative means of
33 estimating Type Np and Type Ns stream lengths using GIS that is consistent with current
34 Washington Forest Practices Rule requirements.

This default basin sizes cited in the Washington Forest Practices Rules have since been eliminated as the direct result of a Policy recommendation the Forest Practices Board (TFW/FFR Policy rule petition to the FP Board 2005). The actual rule language

currently defining the Type Np/Ns defaults was approved by the Forest Practices Board to be stricken from the DNR Board Manual. During their research project prioritization process, CMER had previously determined that the current Type Np/Ns defaults were based on "very little science underlying the rule" and consequently, posed a "high risk" to aquatic resources which is why the project was given high priority (CMER Work Plan 2005, CMER Protocols and Standards Manual 2005). Therefore, use of the Type Np/Ns defaults in CACs for the purpose of estimating take is inappropriate for the FPHCP and the Minimal Effects Strategy.

Concerning the upper extent of the Type Np channel network in eastern and western Washington, the Services respond (Section 3.6.4 Type N Stream Demarcation) :

17 Another commenter stated the Type N Stream Demarcation studies (Palmquist 2003;
18 Pleus and Goodman 2003), generated by the adaptive management program and the
19 Northwest Indian Fisheries Commission, directly affect the Critical Area Calculations in
20 the FPHCP. Both of these studies clearly invalidate the FFR default basin areas for Type
21 Np waters in both eastern and western Washington, used in the DEIS Water Type
22 Modeling approach (Appendix B), to calculate Critical Areas for estimating effects in the
23 Minimal Effects Strategy in the FPHCP (FPHCP Appendix K; FPHCP Chapter 4e; DEIS
24 Appendix B). The commenter concluded that this significant underestimate in Type Np
25 channel length was not accounted for in the Critical Areas Estimates for the Minimal
26 Effects Strategy in the FPHCP for estimating effects.
27 The Services note that DNR did not use the Type N study data because it has not been
28 fully considered within the adaptive management process. The Palmquist (2003) and
29 Pleus and Goodman (2003) studies have been reviewed by the Scientific Review
30 Committee and have been approved by CMER; and the TFW/FFR Policy Group has
31 made a recommendation to the Forest Practices Board. The Board has not yet acted on
32 the recommendation. Until then, the current default basin sizes will remain in the
33 Washington Forest Practices Rules. However, landowners do not always use the default
34 basin sizes to define the Type Np/Ns break. The degree to which landowners use the
35 default basin sizes versus field indicators to define the Type Np/Ns break is unknown.
36 Therefore, rather than speculate about how the Type Np/Ns break is being defined across
37 the landscape and the associated effects on Type Np stream length, DNR decided to use
38 the current default basin sizes as a consistent means of estimating the extent of the Type
39 Np network in the FPHCP Critical Areas Calculations.

This is not completely factual. Again, the TFW/FFR Policy Group actually submitted a petition to the Forest Practices Board specifically recommending that the FFR default basin sizes defining the Type Np/Ns break be stricken from the Forest Practices Board Manual (FFR Policy Petition for Rule Making to the FP Board 2005). More importantly, my comment was directed at how using the FFR defaults affects the CACs in the Minimal Effects Strategy, not the FPHCP which use an unknown quantity of a combination of both defaults and field identification making them difficult to compare.

Furthermore, both the Pleus and Goodman (2003) and the CMER (Palmquist 203) Type N Demarcation studies indicated that the majority of the Type N channel network

consists of predominantly Type Np (perennial) not Type Ns (seasonal) streams. That is, 95% of all Type Np/Ns demarcation points were found within 100 meters of the channel head (Ch), with 75% found within 30 meters of the Ch. These findings are reflected in the results of both studies (Pleus and Goodman 2003, Palmquist 2003) and the CMER/Policy Interaction Framework document submitted by CMER to Policy (CMER 2005).

Given the above study results (Pleus and Goodman 2003, Palmquist 2003), the Minimal Effects CACs should have run the Type Np channel length to within at least 100 meters of the channel head during their modeling effort. By electing to use the DNR defaults instead, that have since been recommended by TFW/FFR Policy and accepted by the Forest Practices Board as grossly incorrect and therefore stricken from the Board Manual, the Minimal Effects CACs do not account for thousands of miles of Type Np channels that exist on the FFR landscape (Palmquist 2003, Estimated Stream length affected by the CMER and Tribal Type Np/Ns Demarcation studies).

The Services have failed to adequately respond to my initial comments on the DEIS concerning:

Implications for Critical Area Calculations:

1. The Type N Demarcation studies (Pleus and Goodman 2003, Palmquist 2003) indicate that Type Np streams make up the majority of the non-fish bearing channel network within watersheds. That is, there are very few Type Ns (seasonal) streams relative to Type Np streams.
2. The use of current FFR Type Np default basin areas (300, 52, and 13 acres for Eastern WA, Western WA, and the Coast, respectively) for Critical Areas Calculations significantly underestimates the total stream length, and associated riparian zone acres, needed to estimate take under the Minimal Effects Strategy.
3. Use of DNR's outdated GIS hydrography (Type 1-5, and 9) layer also significantly underestimates the extent of Type Np waters on FFR lands for the purposes of estimating "take" under the ESA.
4. The analysis estimating the length of the affected reach of Type Np waters under current FFR defaults (Palmquist 2003) indicate that thousands of miles of Type Np waters are not being accounted for in the Minimal Effects Strategy. Most importantly, this study indicates that Type Np waters have been severely under protected over the past 5 years by use of FFR defaults which creates an even greater disparity between the total riparian zone area the Minimal Effects Strategy is intended to protect and the total riparian zone area that is actually being left on the ground using FFR defaults.
5. The DNR interim water typing system is not a "reasonable surrogate for the permanent water typing system still under development." (Cole et al. 2003, Palmquist 2003, Pleus and Goodman 2003, Cupp 2001, Cupp 2004)
6. DNR's statewide maps depicting Site Class are non representative of true field Site Class as they were found to underestimate field Site Class 59% of the time (Schuett-Hames et al. 2003)

Based on the Services inadequate response to my comments to the DEIS on their methods used to calculate Critical Areas for the purpose of estimating 'take" under the ESA, and their subsequent failure to make any substantive changes to the FEIS, my initial Summary and Conclusions are still valid:

Summary and Conclusions

The riparian modeling techniques and water typing conversion methods used in determining critical areas acreage calculations for the purpose of estimating "take" under the ESA are severely flawed (Table 4.13 chapter 4e, Table 3., Table 5. Appendix K Draft FPHCP; Section 3.3, 3.3.1 - 3.3.4, 3.4, Tables B-3, B-4, B-5, B-6 Appendix B Draft EIS). Use of these methods as outlined in Appendix B of the FPHCP and Appendix K of the Draft EIS has artificially inflated critical areas riparian acreage estimates in the FPHCP Strategy, and significantly under estimated critical areas riparian acreage estimates in the Minimal Effects Strategy.

The riparian modeling methods are also inconsistent with Forest Practices Board Manual language regulating timber harvesting in riparian zones on Type F waters in eastern and western Washington as outlined in WAC 222-030-021. The methods also fail to address FFR Adaptive Management and NWIFC Type N demarcation studies (Palmquist 2003, Pleus and Goodman 2003) which indicate that Type Np channels constitute the majority of the channel network in watersheds across FFR lands.

Correcting for these fatal flaws has resulted in a significant decrease in the FPHCP total critical areas acreage as a proportion of the acreage covered in the Minimal Effects Strategy (Table 5a above). The revised critical areas calculations indicate that only 50%, not 80%, of the total Minimal Effects critical areas are being met by the FPHCP critical areas. That proportion drops to 42% when comparing critical Riparian Zone Areas only (excluding unstable slopes). This is a conservative estimate based on the exclusion of other limitations identified in the Draft EIS and FFR HCP (e.g. the management FPHCP RMZ "inner zones") that would otherwise lower the coverage even further.

	Riparian Zone Area (acres)	Unstable Slopes Area (acres)	Total (acres)	FPHCP as % of Minimal Effects
Minimal Effects Strategy				
Western Washington	2,584,612	358,251	2,942,863	
Eastern Washington	526,351	128,207	654,558	
Total	3,110,963	486,458	3,597,421	
FPHCP Strategy				
Western Washington	1,085,629	358,251	1,443,880	**49%**
Eastern Washington	224,604	128,207	352,811	**54%**
Total	1,310,233	486,458	1,796,691	**50%**

By establishing a hypothetical Minimal Effects Strategy as a means of estimating "take" under the Federal Endangered Species Act, the FPHCP has essentially set a new standard for minimizing take not considered by any of the other Alternatives outlined in the Plan. The Approach in chapter 4e. "Direct and Indirect Effects of Activities Covered by the Plan" states:

"Estimating take for purposes of the FPHCP focuses on the number of habitat acres affected by the plan. The approach involves developing a hypothetical management strategy that it is assumed would 1) have minimal effects on species covered by the plan, and 2) result in very low levels of take. This "minimal effects" strategy serves as a baseline for evaluating and comparing management under the FPHCP. Differences between the minimal effects and FPHCP strategies are compared both quantitatively, in terms of the number of habitat acres affected, and qualitatively, in terms of the expected effects of implementing certain site- and watershed-scale protection measures."

Federal Habitat Conservation Plans are required to provide habitat protections for listed species to the "maximum extent practicable". Arguably, the hypothetical Minimal Effects Strategy would provide such protections as it would "result in very low levels of take" thereby providing habitat protections to the maximum extent practicable. Our revision to critical areas calculations outlined in Table 5a. indicate that the FPHCP only provides one half (50%) the habitat protections needed under the Minimal Effects Strategy.

Estimating "take" by quantifying the number of habitat acres affected by the Plan will have to be recalculated based on the critical flaws in riparian modeling and water typing conversion methods stated above. Without a more accurate estimate of the total amount of riparian habitat being protected under FFR riparian prescriptions, accurately estimating take will not be possible. The DNR should consider adopting the Minimal Effects Strategy as an Alternative in the FPHCP to minimizing take based on their rationale underlying this Approach, i.e. it results in very low levels of take.

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Cole, M.B., M.P. Killian, and A.P. Harris. 2003. Last fish surveys for eastern Washington water typing model development. Final Report. ABR Inc. Forest Grove, Oregon.

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Instream Scientific Advisory Group. 2004. Monthly minutes from ISAG meetings from year 2004. Washington Department of Natural Resources, Olympia, WA.

McConnell, S. 2004. An analysis of forest practice applications: stand characteristics current and projected to age 140. Northwest Indian Fisheries Commission, Lacey, Washington.

Palmquist, R. 2003. Type N stream demarcation study phase I: Pilot results. Versions 6.8, NWIFC, Olympia WA.

Palmquist, R. 2003. Estimated length of affected stream channel. Memorandum to CMER, NWIFC, Olympia, WA.

Pleus, A. and P Goodman. 2003. Type N stream demarcation study: 2002 Tribal perennial stream survey data collection using CMER methods. Report 11/6/03 Tribal TFW/Forest and Fish Program. Northwest Indian Fisheries Commission, Lacey, Washington.

Schuett-Hames, D, R. Conrad, and A. Roorbach. 2005. Validation of the western Washington riparian desired future conditions (DFC) performance targets in the Washington state forest practices rules with data from mature, unmanaged, conifer dominated riparian stands. Northwest Indian Fisheries Commission. Olympia, WA.

United States Department of Commerce National Marine Fisheries Service, and the U.S. Department of the Interior Fish and Wildlife Service. 2005. Draft Environmental Impact Statement for the proposed issuance of multiple species incidental take permits or 4(d) rules for the Washington State forest practices habitat conservation plan. Lacey, Washington.

Washington State Department of Natural Resources. 2001. Washington forest practices board manual. Washington Forest Practices Board. Olympia, WA.

Washington State Department of Natural Resources. 2004. Draft Forest Practices Habitat Conservation Plan. Olympia, WA

Type N Stream Buffers (Section 3.6.5 FEIS 2006)

The Services response to my comments to the DEIS on Type N stream buffers are inadequate, incomplete, and clearly demonstrate that they are completely out of touch with research projects currently being conducted under the CMER Work plan (2005). One again, they also fail to explain why they selectively excluded substantial amounts of previous research conducted by CMER through the TFW process regarding the impacts of forest practices on physical processes affecting LWD recruitment, sediment storage and routing, and channel morphology in headwater streams (Type N) and their potential impact to downstream adjacent Type F waters (fish-bearing).

Specifically, my related comments to the DEIS (2005) include:

3 - Comments to Subsection 4d-1.1 Riparian Management Zones: Providing Large Woody Debris and Shade, under 4d-1 Rationale for Riparian Conservation Strategy.

Type Np Waters

This version of the Draft FPHCP (as opposed to the last version that I commented on) devotes a sparse 2 paragraphs describing how the plan will provide for large woody debris (LWD) and shade on Type Np waters (pages 219-220) then defers to the Adaptive Management program to answer key questions that *"will assess the effectiveness of Type Np buffers in meeting resource objectives (CMER Work Plan, Appendix H)."* As mentioned in my comments addressing the "Structural problems with adaptive management" most (4 of 6) of the Type N research projects under this particular AM program have been delayed because *"the proposed research and monitoring projects exceed the availability of funding and the capability of human resources."* (CMER Work Plan, Appendix H). The FPHCP's brief rationale for providing LWD to Type Np waters is based on a single citation (McDade et al. 1990) and states:

"Given the many factors that affect tree retention adjacent to Type Np waters, wood recruitment to these streams is likely to vary considerably from site to site. The results of McDade et al. (1990) indicate that 70 percent of in-stream woody debris from mature conifer forests has source distances of 50 feet or less. Since at least 50 percent—and as much as 100 percent—of the Type Np water length will receive RMZs that are 50 feet wide, between 35 percent and 70 percent of the potential LWD supply within each Type Np network will be retained in streamside buffers. Precise recruitment levels will vary according to the proportion of the Type Np network protected."

This statement contradicts the accompanying Draft EIS (2004) which states that Np waters *"would provide 43 to 51 percent of full LWD recruitment based on the 100-year site potential tree height criterion..."* (Riparian and Wetland Processes, Overview of Effects, Draft EIS 2004).

The Rationale for the Riparian Conservation Strategy (4d-1) is Severely Flawed.

The literature presented above details the physical processes controlling the recruitment, storage, and transport of wood and sediment in steep Type Np channels. Specifically, it articulates the functional role of large woody debris as a sediment retention mechanism in these channel types, and how the removal of that mechanism linked to the removal of riparian buffers due to past and present forest practices has increased the rate and distribution of mass wasting events across the managed landscape. Having participated in several Washington Watershed Analyses, this fact is born out in just about every single Watershed Analysis Report conduced in cooperation with DNR.

Moreover, these principal processes controlling channel form and function are recognized in the WDNR FEIS on Alternatives for Forest Practices Rules for Aquatic and Riparian

Resources (2001) . Below is a reference taken from Chapter 3 (section 3.4.2 Affected Environments, subsection 3.4.2.1 Riparian Function – LWD Recruitment, pg. 3-36) of the WDNR FEIS supporting the above argument and discussion:

"Riparian areas are an important source of LWD that enters, or is recruited to, the stream channel. LWD included entire trees, rootwads, and larger branches. Numerous studies have shown that LWD is an important component of fish habitat (Swanson et al., 1976; Bisson et al., 1987; and Naiman et al., 1992). Trees that fall into streams are critical for sediment retention (Keller and Swanson, 1979; Sedell e al., 1988), gradient modification (Bilby, 1979), structural diversity (Ralph et al., 1994), nutrient production (Cummins 1974), and protective cover from predators. LWD also recreates storage sites for sediment in all sizes of streams. In small headwater streams, wood controls sediment movement downstream minimizing the risk of debris flows."

The Report further states that: "Large wood recruitment originates from a variety of processes tree mortality (toppling), windthrow, undercutting of stream banks, debris avalanches, deep-seated mass soil movements, and redistribution from upstream (Swanson and Lienkamper, 1978). First and second order headwater streams can also provide wood to larger higher order channels downstream (Potts and Anderson, 1990; Prichard et al., 1998; Coho and Burges, 1991). Two predominant mechanisms have been observed for the movement of LWD between stream types; transport during high flow events and debris torrents, which includes dam-brake floods and debris flows (Swanson and Lienkamper, 1978)....The occurrence of debris torrents, although less frequent than the redistribution of LWD from high flows, can introduce large amounts of LWD [and sediment] (Lambertie et al., 1991). Additionally, debris flows originating in managed forests (albeit, under older less protective rules) occurred at a much higher rate than that of unmanaged forests (Swanson, 1976, Morrison, 1975). The majority of debris flows and dam-break floods are initiated in lower order channels, primarily second-order streams (Coho and Burges 1991). These may travel upwards of 2.5 miles into higher order low gradient valley floors, and cause significant damage to riparian vegetation and aquatic habitat during and after the event (Coho and Burges 1991). " **The most obvious schemes for avoiding the destructive forces of organic debris movement are maintaining contiguous riparian zones of mature conifers around low order channels and minimizing deposition of logging slash and debris into those channels" (Coho and Burges 1991).**

The Services response to this comment reads:

41 Commenters were concerned about the amount of protection afforded Type N streams by
42 the FPHCP. The commenters noted that Type N channels are significant sources of
43 sediment, they are sensitive to disturbance, and the time required for recovery is
1 significant. The commenters suggested that full riparian buffers on Type N channels are
2 necessary to provide sediment filtering and LWD input. The Services disagree. The
3 Services believe sufficient information exists to determine whether Type N channel
4 riparian prescriptions are appropriate under ESA Sections 10 and 7. Also, areas
5 susceptible to mass wasting and erosion, such as steep side slopes, are protected by

6 unstable slopes rules. However, the Services note and support the high priority of Type 7 N research and monitoring under the CMER Work Plan.

The Services would be well served to read the CMER Work plan which clearly shows that the majority of the Type N projects that were designated as "high priority" are currently in "delay" status precisely because "the proposed research and monitoring projects exceed the availability of funding and the capability of human resources." (CMER Work Plan, Appendix H). The Services repeatedly defer to CMER as their answer to resolving many of the concerns with leaving approximately 50% of the Type N channel network completely unprotected without acknowledging CMER's limitations to getting the work done clearly spelled out in their Work plans (2002-2006).

Regarding the selective exclusion of significant amounts of pertinent literature by the Services that rationalize and support greater riparian protections on Type Np waters, the Services respond:

20 One commenter asserted that the FPHCP ignored a wealth of scientific literature that
21 specifically addresses the impacts of forest practices on the physical processes affecting
22 LWD recruitment in Type Np channels. The commenter then questioned the FPHCP's
23 ability to provide adequate conservation measures given that it only provides a portion of
24 full LWD recruitment into Type Np channels. The Services note the comment. The
25 Services did not ignore scientific information. Instead, we cited references in the DEIS
26 that we believe reflect the current body of knowledge regarding the impacts of forest
27 practices on physical processes affecting LWD recruitment. All pathways of LWD
28 recruitment to Type Np streams are intended to be addressed by the FPCHP's
29 conservation measures.

The Services continued denial and failure to recognize references provided in my comments to the DEIS (2005) that serve as a critical part of the "*current body of knowledge regarding the impacts of forest practices on physical processes affecting LWD recruitment*" in Type Np waters is astounding. Particularly since the majority of the pertinent literature that they selectively excluded was in fact generated by the CMER TFW Process and the WDNR. In this case, we're are not even addressing or discussing "outside" science. This is literature that was generated in cooperation with, and in several cases conducted by, the same Washington State agency seeking federal permits under the proposed HCP, WDNR. What's more and as cited above, this literature was included in the WDNR State Lands HCP to rationalize greater protection for Type Np waters.

My comments to the DEIS clearly articulate this:

"The list of citations provided below specifically address the physical processes controlling coarse sediment recruitment, storage and transport in Type Np Channels, how those processes relate to the functional role of large woody debris (LWD) as a sediment retention mechanism, and their potential impacts to amphibians and adjacent, downstream fish-bearing reaches. This list includes but is not limited to: Swanson et al. 1976; Swanston and Swanson 1976; Nussbaum 1977; Swanson et al. 1982; Swanson et al., 1987; Swanson and Lienkaemper, 1978; Swanston and Swanson, 1976; Benda and

Cundy 1990; *Montgomery and Buffington, 1993; *O'Conner and Harr, 1994; *Coho and Burges, 1994; *Johnson 1991; Ralph et al. 1994; Lamberti et al. 1991; *Coho and Burges, 1991; Hass 1996; Montgomery et al., 1998; Hays 1998; Nijhuis and Kaplan 1998; *Soicher 1999; Adams and Bury 2002; *Chesney 2000; Gresswell and May, 2000; Potts and Anderson, 1990; Prichard et al., 1998; Kiffney et al., 2000; McHenry et al. 1998; Benda et al. 2003; Simpson Timber Co. 2000; *WDNR 1996; *WDNR 1996; *WDNR 2001; *Washington Watershed Analysis Manual 1995;"

"Not surprisingly, many of the above reports were generated by the TFW agreement for the purpose of informing DNR's Watershed Analysis Process (*), whose fundamental concepts are incorporated into the Washington Watershed Analysis Manual (1995). The above reports are also frequently cited in the DNR Final Environmental Impact Statement (FEIS) on Alternatives for Forest Practices for Aquatic and Riparian Resources (2001). This DNR document (2001) which was produced under the requirements of the State Environmental Policy Act (SEPA) when the new Forest Practices rules were adopted."

"It is unclear exactly how or why the authors of the FPHCP have failed to acknowledge the references pertaining to Type Np and Type F waters in these reports as they are readily available in DNR's forest practices reference library (Olympia, Washington). This lack of reference, and institutional memory, is a major oversight by the authors as the direct impacts of steep Type Np channels on adjacent downstream fish-bearing reaches has broad implications for listed amphibian and fish species that are being considered for protection under the FPHCP. Most importantly, the rationale underpinning conservation measures for many of these same species covered under previously approved federal HCPs is largely premised on the acknowledgment and understanding of the physical processes controlling channel connectivity interactions affecting those species (WDNR HCP, 1996; Simpson HCP, 2000)."

It escapes me how or why the Services would exclude (many of which were generated by CMER/TFW and WDNR) studies from what they interpret as the "current body of knowledge" with titles reading:

Benda, L.E., and T. Cundy. 1990. Predicting deposition of debris flows in mountain channels. Canadian Geotechnical Journal 27: 409-417.

Benda, L., C Veldhuisen, and J Black. 2003. Debris flow as agents of morphological heterogeneity at low-order confluences, Olympic mountains, Washington. Geological Society of America, v. 115;no.9;p.1110-1121.

Chesney, C. 2000. Functions of wood in small, steep streams in eastern Washington: summary of results for project activity in the Ahtanum, Cowiche, and Tieton basins. Timber/Fish/Wildlife Report # TFW-MAG1-00-002.

Coho, C., and S.J. Burges. 1991. Analysis of initiation mechanisms of dam-break floods in managed forests. Timber/Fish/Wildlife Report # TFW-SH9-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Coho, C., and S.J. Burges. 1994. Dam-break floods in low order mountain channels of the Pacific Northwest. Timber/Fish/Wildlife Report # TFW-SH9-93-001, Washington Dept. of Natural Resources, Olympia, WA.

Johnson, A.C. 1991. Effects of landslide-dam-break floods on channel morphology. Timber/Fish/Wildlife Report # TFW-SH17-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Gresswell, R.E., and C.L. May. 2000. Large wood recruitment and redistribution. Pages 61-64 *in* J. Erickson, editor. The Cooperative Forest Ecosystem Research Program, annual report, Corvallis, Oregon.

Haas, A.D. 1996. Coarse sediment storage by large woody debris in small, steep streams of the North Cascades, Washington State. Unpublished thesis, Department of Geological Sciences, University of Washington, Seattle, Washington.

Johnson, A.C. 1991. Effects of landslide-dam-break floods on channel morphology. Timber/Fish/Wildlife Report # TFW-SH17-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Kiffney, P. M., J.S. Richardson, and M.C. Feller. 2000. Fluvial and epilithic organic matter dynamics in headwater streams of southwestern British Columbia, Canada. Arch. Hydrobiol 683: 1-21.

Lamberti, G.A., S.V. Gregory, L.R. Ashkenas, R.C. Wildman, and K.M.S. Moore. 1991. Stream ecosystem recovery following a catastrophic debris flow. Can. J. Fish Aq. Sci 48: 196-208.

McHenry, M.L., E. Shott, R.H. Conrad, and G.B. Grette. 1998. Changes in the quantity and characteristics of large woody debris in streams of the Olympic Peninsula, Washington, USA (1982-1993). Canadian Journal of Fisheries and Aquatic Sciences 55: 1395-1407.

Montgomery, D.R., T.B. Abbe, J.M. Buffington, N.P. Peterson, K.M. Schmidt, and J.D. Stock. 1996. Distribution of bedrock and alluvial channels in forested mountain drainage basins. Nature 381(13):587-589.

Montgomery, D.R., and J.M. Buffington. 1993. Channel Classification, prediction of channel response, and assessment of channel condition. Timber/Fish/Wildlife Report TFW-SH10-93-002, 112p.

O'Conner, M., and R.D. Harr. 1994. Bedload transport and large organic debris in steep mountain streams in forested watersheds of the Olympic Peninsula, Washington. Timber/Fish/Wildlife Report # TFW-SH7-94-001. Washington Department of Natural Resources, Olympia, WA.

Potts, D.F., and B.K.M. Anderson. 1990. Organic debris and the management of small stream channels. West. J. App. Forestry 5: 25-28.

Pritchard, D., J. Anderson, C. Corell, J. Fogg, K, Geghardt, R Krapf, S. Leonard, B. Mitchell, and J. Staats. 1998. Riparian area management: A user guide to assessing proper functioning conditions and the supporting science for lotic areas. Tech. Ref. 1737-15, USDI, Bureau of Land Management, National Applied Resource Sciences Center. Denver, Colorado.

Ralph, S.C., G.C. Poole, L.L. Conquest, and R.J. Naiman. 1994. Stream channel morphology and woody debris in logged and unlogged basins of western Washington. Canadian Journal of Fisheries and Aquatic Sciences 51:37-51.

Sedell, J.R., P.A. Bisson, F.J. Swanson, and S.V. Gregory. 1998. What we know about large trees that fall into streams and rivers. In: C. Maser (editor). From the forest to the sea: A story of fallen trees. Pages 47081. General technical report PNW-GTR-229. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Soicher, A. 1999. Assessing the effectiveness of large woody debris prescriptions in the Acme watershed: Phase 1 -- baseline data collection. Timber/Fish/Wildlife report # TFW-MAG1-99-002, Washington Department of Natural Resources, Olympia WA.

Swanson, F.J., G.W. Lienkaemper, and J.R. Sedell. 1976. History, physical effects, and management implications of large organic debris in western Oregon streams. General technical report PNW-56. USDA Forest Service, Portland, Oregon.

Swanson, F.J., and G.W. Liekaemper. 1978. Physical consequences of large organic debris in Pacific Northwest streams, USDA Forest Service.

And this list is not exhausted. All of the above research papers contribute a wealth of information to the *"current body of knowledge regarding the impacts of forest practices on physical processes affecting LWD recruitment"* but were selectively excluded by the Services who instead list only a few selective references that do not directly challenge their conservation strategy in Type Np waters. Specifically, in Section 3.6.1 (Riparian Function, FEIS 2006) their response to this valid criticisms states:

23 Another commenter was concerned that the FPHCP ignored literature on the impacts to
24 physical processes affecting LWD recruitment and temperature on type Np channels.
25 The Services disagree. Section 4d-1.1 of the Draft HCP provides the rationale for
26 riparian prescriptions adjacent to Type Np waters. Citations included in this section that
27 address the physical processes controlling channel form and function, and articulate the
28 role of LWD as a sediment retention mechanism include Gregory and Bisson (1997),
29 Bisson et al. (1987), Harmon et al. (1986), McDade et al. (1990), McKinley (1997),
30 Forest Ecosystems Management Assessment Team (FEMAT) (1993), Murphy and Koski
31 (1989), Van Sickle and Gregory (1990), Benda et al. (in press), McArdle et al. (1961),

32 Robison and Beschta (1990), and Bragg et al. (2000).

Summary

In their Response to Comments (2006), the Services have failed to adequately address my comments concerning their Rationale for the Riparian Conservation Strategy in the FEIS of the FPHCP. What is most disturbing is how the Services repeatedly, and with false confidence, defer to the CMER Work Plan as the answer to all of the valid criticisms of this FPHCP concerning the short comings of their conservation strategy. As a CMER member representing the Conservation Caucus, and based on the Services Response to Comments (2006), it's obvious that they have yet to read the CMER work plan in detail. Had they done so, they would quickly realize that CMER has significant limitations in their ability to conduct research because *"the proposed research and monitoring projects exceed the availability of funding and the capability of human resources."* (CMER Work Plan, Appendix H). Had the Services bothered to read the CMER Work plan, they would also come to realize that many of the adaptive management research projects that were "prioritized" by CMER are still in the "delay" category precisely because of these CMER limitations, most notable are those related to the Type N water riparian prescriptions.

Equally disturbing, and most hypocritical, is how on one hand the Services continually defer to the CMER Work plan (which, based on their comments, they obviously haven't read in detail) as the answer to most of the valid criticisms and concerns with the FPHCP adaptive management program (in this case riparian buffers on Type Np waters) while they simultaneously use the other hand to cover up and/or exclude CMER/TFW and WDNR research supporting those valid criticisms.

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February 23, 2006

Comments to the "FEIS Response to Comments" (January 2006) on DEIS comments submitted by ARC Consultants.

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The Services response to my comments to the DEIS on Type N stream buffers are inadequate, incomplete, and clearly demonstrate that they are completely out of touch with research projects currently being conducted under the CMER Work plan (2005). One again, they also fail to explain why they selectively excluded substantial amounts of previous research conducted by CMER through the TFW process regarding the impacts of forest practices on physical processes affecting LWD recruitment, sediment storage and routing, and channel morphology in headwater streams (Type N) and their potential impact to downstream adjacent Type F waters (fish-bearing).

Specifically, my related comments to the DEIS (2005) include:

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The Rationale for the Riparian Conservation Strategy (4d-1) is Severely Flawed.

The literature presented above details the physical processes controlling the recruitment, storage, and transport of wood and sediment in steep Type Np channels. Specifically, it articulates the functional role of large woody debris as a sediment retention mechanism in these channel types, and how the removal of that mechanism linked to the removal of riparian buffers due to past and present forest practices has increased the rate and distribution of mass wasting events across the managed landscape. Having participated in several Washington Watershed Analyses, this fact is born out in just about every single Watershed Analysis Report conduced in cooperation with DNR.

Moreover, these principal processes controlling channel form and function are recognized in the WDNR FEIS on Alternatives for Forest Practices Rules for Aquatic and Riparian Resources (2001). Below is a reference taken from Chapter 3 (section 3.4.2 Affected Environments, subsection 3.4.2.1 Riparian Function – LWD Recruitment, pg. 3-36) of the WDNR FEIS supporting the above argument and discussion:

"Riparian areas are an important source of LWD that enters, or is recruited to, the stream channel. LWD included entire trees, rootwads, and larger branches. Numerous studies have shown that LWD is an important component of fish habitat (Swanson et al., 1976; Bisson et al., 1987; and Naiman et al., 1992). Trees that fall into streams are critical for sediment retention (Keller and Swanson, 1979; Sedell e al., 1988), gradient modification (Bilby, 1979), structural diversity (Ralph et al., 1994), nutrient production (Cummins 1974), and protective cover from predators. LWD also recreates storage sites for sediment in all sizes of streams. In small headwater streams, wood controls sediment movement downstream minimizing the risk of debris flows."

The Report further states that: "Large wood recruitment originates from a variety of processes tree mortality (toppling), windthrow, undercutting of stream banks, debris avalanches, deep-seated mass soil movements, and redistribution from upstream (Swanson and Lienkamper, 1978). First and second order headwater streams can also provide wood to larger higher order channels downstream (Potts and Anderson, 1990; Prichard et al., 1998; Coho and Burges, 1991). Two predominant mechanisms have been observed for the movement of LWD between stream types; transport during high flow events and debris torrents, which includes dam-brake floods and debris flows (Swanson and Lienkamper, 1978)....The occurrence of debris torrents, although less frequent than the redistribution of LWD from high flows, can introduce large amounts of LWD [and

sediment] (Lambertie et al., 1991). Additionally, debris flows originating in managed forests (albeit, under older less protective rules) occurred at a much higher rate than that of unmanaged forests (Swanson, 1976, Morrison, 1975). The majority of debris flows and dam-break floods are initiated in lower order channels, primarily second-order streams (Coho and Burges 1991). These may travel upwards of 2.5 miles into higher order low gradient valley floors, and cause significant damage to riparian vegetation and aquatic habitat during and after the event (Coho and Burges 1991). " **The most obvious schemes for avoiding the destructive forces of organic debris movement are maintaining contiguous riparian zones of mature conifers around low order channels and minimizing deposition of logging slash and debris into those channels" (Coho and Burges 1991).**

The Services response to this comment reads:

41 Commenters were concerned about the amount of protection afforded Type N streams by
42 the FPHCP. The commenters noted that Type N channels are significant sources of
43 sediment, they are sensitive to disturbance, and the time required for recovery is
1 significant. The commenters suggested that full riparian buffers on Type N channels are
2 necessary to provide sediment filtering and LWD input. The Services disagree. The
3 Services believe sufficient information exists to determine whether Type N channel
4 riparian prescriptions are appropriate under ESA Sections 10 and 7. Also, areas
5 susceptible to mass wasting and erosion, such as steep side slopes, are protected by
6 unstable slopes rules. However, the Services note and support the high priority of Type
7 N research and monitoring under the CMER Work Plan.

The Services would be well served to read the CMER Work plan which clearly shows that the majority of the Type N projects that were designated as "high priority" are currently in "delay" status precisely because "the proposed research and monitoring projects exceed the availability of funding and the capability of human resources." (CMER Work Plan, Appendix H). The Services repeatedly defer to CMER as their answer to resolving many, if not all, of the valid concerns with leaving approximately 50% of the Type N channel network completely unprotected without acknowledging CMER's limitations to getting the work done clearly spelled out in their Work plans (2002-2006).

Regarding the selective exclusion of significant amounts of pertinent literature by the Services that rationalize and support greater riparian protections on Type Np waters, the Services respond:

20 One commenter asserted that the FPHCP ignored a wealth of scientific literature that
21 specifically addresses the impacts of forest practices on the physical processes affecting
22 LWD recruitment in Type Np channels. The commenter then questioned the FPHCP's
23 ability to provide adequate conservation measures given that it only provides a portion of
24 full LWD recruitment into Type Np channels. The Services note the comment. The
25 Services did not ignore scientific information. Instead, we cited references in the DEIS
26 that we believe reflect the current body of knowledge regarding the impacts of forest

27 practices on physical processes affecting LWD recruitment. All pathways of LWD
28 recruitment to Type Np streams are intended to be addressed by the FPCHP's
29 conservation measures.

The Services continued denial and failure to recognize the wealth of related information and references provided in my comments to the DEIS (2005) that serve as a critical part of the "*current body of knowledge regarding the impacts of forest practices on physical processes affecting LWD recruitment*" in Type Np waters is astounding. Particularly since the majority of the pertinent literature that they selectively excluded was in fact generated by the CMER TFW Process and the WDNR preceding the FFR in order to inform the Washington Watershed Analysis Process. All of these reports are housed at the WDNR and the NWIFC (http: www.dnr.wa.gov/cgi-bin/wsasmt.cgi; http://www.nwifc.org/tfw/downloads). In this case, we aren't even addressing or discussing "outside" science. This is literature that was generated in cooperation with, and in several cases conducted by, the same Washington State agency seeking federal permits under the proposed HCP; WDNR. What's more and as cited above, this literature was included in the WDNR State Lands HCP to rationalize greater protection for Type Np waters.

My comments to the DEIS clearly articulate this:

"The list of citations provided below specifically address the physical processes controlling coarse sediment recruitment, storage and transport in Type Np Channels, how those processes relate to the functional role of large woody debris (LWD) as a sediment retention mechanism, and their potential impacts to amphibians and adjacent, downstream fish-bearing reaches. This list includes but is not limited to: Swanson et al. 1976; Swanston and Swanson 1976; Nussbaum 1977; Swanson et al. 1982; Swanson et al., 1987; Swanson and Lienkaemper, 1978; Swanston and Swanson, 1976; Benda and Cundy 1990; *Montgomery and Buffington, 1993; *O'Conner and Harr, 1994; *Coho and Burges, 1994; *Johnson 1991; Ralph et al. 1994; Lamberti et al. 1991; *Coho and Burges, 1991; Hass 1996; Montgomery et al., 1998; Hays 1998; Nijhuis and Kaplan 1998; *Soicher 1999; Adams and Bury 2002; *Chesney 2000; Gresswell and May, 2000; Potts and Anderson, 1990; Prichard et al., 1998; Kiffney et al., 2000; McHenry et al. 1998; Benda et al. 2003; Simpson Timber Co. 2000; *WDNR 1996; *WDNR 1996; *WDNR 2001; *Washington Watershed Analysis Manual 1995;"

"Not surprisingly, many of the above reports were generated by the TFW agreement for the purpose of informing DNR's Watershed Analysis Process (*), whose fundamental concepts are incorporated into the Washington Watershed Analysis Manual (1995). The above reports are also frequently cited in the DNR Final Environmental Impact Statement (FEIS) on Alternatives for Forest Practices for Aquatic and Riparian Resources (2001). This DNR document (2001) which was produced under the requirements of the State Environmental Policy Act (SEPA) when the new Forest Practices rules were adopted."

"It is unclear exactly how or why the authors of the FPHCP have failed to acknowledge the references pertaining to Type Np and Type F waters in these reports as they are readily available in DNR's forest practices reference library (Olympia, Washington). This lack of reference, and institutional memory, is a major oversight by the authors as the direct impacts of steep Type Np channels on adjacent downstream fish-bearing

reaches has broad implications for listed amphibian and fish species that are being considered for protection under the FPHCP. Most importantly, the rationale underpinning conservation measures for many of these same species covered under previously approved federal HCPs is largely premised on the acknowledgment and understanding of the physical processes controlling channel connectivity interactions affecting those species (WDNR HCP, 1996; Simpson HCP, 2000)."

It escapes me how or why the Services would exclude (many of which were generated by CMER/TFW and WDNR) scientific peer reviewed studies from what they interpret as the "current body of knowledge" with titles reading:

Benda, L.E., and T. Cundy. 1990. Predicting deposition of debris flows in mountain channels. Canadian Geotechnical Journal 27: 409-417.

Benda, L., C Veldhuisen, and J Black. 2003. Debris flow as agents of morphological heterogeneity at low-order confluences, Olympic mountains, Washington. Geological Society of America, v. 115;no.9;p.1110-1121.

Chesney, C. 2000. Functions of wood in small, steep streams in eastern Washington: summary of results for project activity in the Ahtanum, Cowiche, and Tieton basins. Timber/Fish/Wildlife Report # TFW-MAG1-00-002.

Coho, C., and S.J. Burges. 1991. Analysis of initiation mechanisms of dam-break floods in managed forests. Timber/Fish/Wildlife Report # TFW-SH9-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Coho, C., and S.J. Burges. 1994. Dam-break floods in low order mountain channels of the Pacific Northwest. Timber/Fish/Wildlife Report # TFW-SH9-93-001, Washington Dept. of Natural Resources, Olympia, WA.

Johnson, A.C. 1991. Effects of landslide-dam-break floods on channel morphology. Timber/Fish/Wildlife Report # TFW-SH17-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Gresswell, R.E., and C.L. May. 2000. Large wood recruitment and redistribution. Pages 61-64 *in* J. Erickson, editor. The Cooperative Forest Ecosystem Research Program, annual report, Corvallis, Oregon.

Haas, A.D. 1996. Coarse sediment storage by large woody debris in small, steep streams of the North Cascades, Washington State. Unpublished thesis, Department of Geological Sciences, University of Washington, Seattle, Washington.

Johnson, A.C. 1991. Effects of landslide-dam-break floods on channel morphology. Timber/Fish/Wildlife Report # TFW-SH17-91-001, Washington Dept. of Natural Resources, Olympia, WA.

Kiffney, P. M., J.S. Richardson, and M.C. Feller. 2000. Fluvial and epilithic organic matter dynamics in headwater streams of southwestern British Columbia, Canada. Arch. Hydrobiol 683: 1-21.

Lamberti, G.A., S.V. Gregory, L.R. Ashkenas, R.C. Wildman, and K.M.S. Moore. 1991. Stream ecosystem recovery following a catastrophic debris flow. Can. J. Fish Aq. Sci 48: 196-208.

McHenry, M.L., E. Shott, R.H. Conrad, and G.B. Grette. 1998. Changes in the quantity and characteristics of large woody debris in streams of the Olympic Peninsula, Washington, USA (1982-1993). Canadian Journal of Fisheries and Aquatic Sciences 55: 1395-1407.

Montgomery, D.R., T.B. Abbe, J.M. Buffington, N.P. Peterson, K.M. Schmidt, and J.D. Stock. 1996. Distribution of bedrock and alluvial channels in forested mountain drainage basins. Nature 381(13):587-589.

Montgomery, D.R., and J.M. Buffington. 1993. Channel Classification, prediction of channel response, and assessment of channel condition. Timber/Fish/Wildlife Report TFW-SH10-93-002, 112p.

O'Conner, M., and R.D. Harr. 1994. Bedload transport and large organic debris in steep mountain streams in forested watersheds of the Olympic Peninsula, Washington. Timber/Fish/Wildlife Report # TFW-SH7-94-001. Washington Department of Natural Resources, Olympia, WA.

Potts, D.F., and B.K.M. Anderson. 1990. Organic debris and the management of small stream channels. West. J. App. Forestry 5: 25-28.

Pritchard, D., J. Anderson, C. Corell, J. Fogg, K, Geghardt, R Krapf, S. Leonard, B. Mitchell, and J. Staats. 1998. Riparian area management: A user guide to assessing proper functioning conditions and the supporting science for lotic areas. Tech. Ref. 1737-15, USDI, Bureau of Land Management, National Applied Resource Sciences Center. Denver, Colorado.

Ralph, S.C., G.C. Poole, L.L. Conquest, and R.J. Naiman. 1994. Stream channel morphology and woody debris in logged and unlogged basins of western Washington. Canadian Journal of Fisheries and Aquatic Sciences 51:37-51.

Sedell, J.R., P.A. Bisson, F.J. Swanson, and S.V. Gregory. 1998. What we know about large trees that fall into streams and rivers. In: C. Maser (editor). From the forest to the sea: A story of fallen trees. Pages 47081. General technical report PNW-GTR-229. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Soicher, A. 1999. Assessing the effectiveness of large woody debris prescriptions in the Acme watershed: Phase 1 – baseline data collection. Timber/Fish/Wildlife report # TFW-MAG1-99-002, Washington Department of Natural Resources, Olympia WA.

Swanson, F.J., G.W. Lienkaemper, and J.R. Sedell. 1976. History, physical effects, and management implications of large organic debris in western Oregon streams. General technical report PNW-56. USDA Forest Service, Portland, Oregon.

Swanson, F.J., and G.W. Liekaemper. 1978. Physical consequences of large organic debris in Pacific Northwest streams, USDA Forest Service.

Additional document located on websites: (http: www.dnr.wa.gov/cgi-bin/wsasmt.cgi; http://www.nwifc.org/tfw/downloads).

And this list is not exhaustive. All of the above research papers contribute a wealth of information to the *"current body of knowledge regarding the impacts of forest practices on physical processes affecting LWD recruitment"* but were selectively excluded by the Services who instead list only a few selective references that do not directly challenge their conservation strategy in Type Np waters. Where are all the references generated from the previous years of WDNR operating under the Washington Watershed Analysis Process? Specifically, in Section 3.6.1 (Riparian Function, FEIS 2006) their response to this valid criticisms states:

23 Another commenter was concerned that the FPHCP ignored literature on the impacts to
24 physical processes affecting LWD recruitment and temperature on type Np channels.
25 The Services disagree. Section 4d-1.1 of the Draft HCP provides the rationale for
26 riparian prescriptions adjacent to Type Np waters. Citations included in this section that
27 address the physical processes controlling channel form and function, and articulate the
28 role of LWD as a sediment retention mechanism include Gregory and Bisson (1997),
29 Bisson et al. (1987), Harmon et al. (1986), McDade et al. (1990), McKinley (1997),
30 Forest Ecosystems Management Assessment Team (FEMAT) (1993), Murphy and Koski
31 (1989), Van Sickle and Gregory (1990), Benda et al. (in press), McArdle et al. (1961),
32 Robison and Beschta (1990), and Bragg et al. (2000).

Summary

In their Response to Comments (2006), the Services have failed to adequately address my comments concerning their Rationale for the Riparian Conservation Strategy in the FEIS of the FPHCP. What is most disturbing is how the Services repeatedly, and with false confidence, defer to the CMER Work Plan as the answer to all of the valid criticisms of this FPHCP concerning fatal flaws in their conservation strategy. As a CMER member representing the Conservation Caucus, and based on the Services Response to Comments (2006), it's obvious that the Services have yet to read the CMER work plan in detail. Had they done so, they would clearly realize that CMER has significant limitations in their ability to conduct research precisely because *"the proposed (AMP) research and monitoring projects exceed the availability of funding and the capability of human resources."* (CMER Work Plan, Appendix H). Had the Services bothered to read the

CMER Work plan in sufficient detail, they would also come to the realization that many of the adaptive management research projects that were "prioritized" by CMER are still in the "delay" category because of these CMER limitations, most notable are those related to the Type N water riparian prescriptions.

Equally disturbing, and most deceitful, is how on one hand the Services continually defer to the CMER Work plan (which, based on their response to comments, they obviously haven't read in detail) as the answer to the majority of the valid criticisms and concerns with the FPHCP's adaptive management program while they simultaneously use the other hand to cover up and exclude a wealth of CMER, TFW and WDNR research supporting those valid criticisms. The Services process for insuring that the "best available science" is used as the foundation upon which to build a more comprehensive "current body of knowledge" in support of the proposed FPHCP is severely lacking. And, quite frankly It's very dishonest and disappointing for them to infer otherwise.

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Comments to the "FEIS Response to Comments" (January 2006) on DEIS comments submitted by ARC Consultants.

The Role of Adaptive Management (Section 3.5.1, FEIS 2006)

The Services response does not adequately address my comments on the Adaptive Management Program's (AMP) "over reliance" on experimental design in response to high scientific uncertainty and risk associated with the FPHCP Riparian Prescriptions. Specifically, those comments were directed at the Services requirements for issuance of n Incidental Take Permit (Federal Register,Vol 65, No. 106, 2000) as follows:

"The FPHCP Adaptive Management Program is over reliant on experimental design in response to high scientific uncertainty and risk associated with FFR Riparian Prescriptions"

"Habitat Conservation Plans are by design responsible for protecting species listed in the plan to the "maximum extent practicable", particularly in cases where there is high scientific uncertainty underlying a rule or regulation. In an addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process (Federal Register,Vol 65, No. 106, 2000) NOAA and the USFWS state that:"

"The Services agree that adaptive management should not be used in place of developing good upfront conservation measures or to postpone addressing difficult issues. However, adaptive management may be necessary to craft a framework for addressing uncertainty in the operating conservation program to ensure that the measures fulfill the biological goals and objectives of an HCP."

"The above federal requirement was not adhered to in the FPHCP which relies heavily on experimental design in place of "upfront conservation measures" in crafting riparian prescriptions designed to protect listed aquatic species. This is most evident in the CMER (Cooperative Monitoring, Evaluation and Research Committee) Work Plan which is tasked with implementing the FPHCP Adaptive Management Program (FPHCP, Appendix H, 2004). The CMER Work Plan describes in detail their process for ranking and prioritizing AM research programs and projects designed to test key assumptions built into specific FFR rules and regulations (FPHCP, Appendix H, 2004). Under the "Effectiveness/Validation and Extensive Monitoring Program Ranking" section of the CMER Work Plan, CMER assesses the "merit" of each program by asking two questions:"

1. *How certain are we of the science and/or assumptions underlying the rule?*
2. *How much risk is there to the protected resource if the science and/or assumptions underlying the rule are incorrect?*

"These key questions concerning the merits of the science underlying assumptions of a forest practices rule, intended to protect listed species under the FPHCP, should have been addressed during initial FRR negotiations well in advance of the public comment period. Putting them off "postpones addressing difficult issues" and stacking them into an increasingly large Adaptive Management pile in the absence of supporting science avoids "developing good upfront conservation". Habitat Conservation Plans by definition should be conservative (conservation minded) to the extent that they provide adequate protections to listed species that mitigates for large gaps in scientific knowledge underlying the forest practice rules governing habitat protection (Walters 1997). The FPHCP takes the opposite approach by minimizing riparian habitat protections in the face of scientific uncertainty in hopes that AM research and monitoring will answer the "difficult questions" that were not addressed on the front end of the FFR negotiations."

The Services response on page 3-38 states:

Still others captured their concerns in the
notion that there was an "over reliance" on the adaptive management program in the
context of an overly complex mitigation strategy in the FPHCP.
In response, it is against the Services' policies to accept known, significant errors in the
initial mitigation strategy, and then use the adaptive management program to "correct" or
improve them. Nor do the Services view the adaptive management process as
"mitigation" for adverse effects. Rather -- and even with an effective adaptive
management program -- the base mitigation strategy or initial minimization and
mitigation measures which are implemented in any HCP should be sufficiently vigorous
so that the Services may reasonably believe that they will be successful. However, the
adaptive management program should be used to address uncertainties associated with
that determination and to improve knowledge over time. The construct is consistent with
what some commenters called the "precautionary approach," although several questioned
whether the FPHCP followed the model.

The Services response fails to acknowledge, address or reconcile the stark difference between what they perceive as an "*adequate base mitigation strategy*" that "*should be suffienctly vigorous so that the Services may reasonable believe that they will be successful*" and CMER's AMP project prioritization process which found that many of the FPHCP rules were based on "high uncertainty in the science underlying specific rules" that posed a "high risk to the resource".

My previous comments from the DEIS state:

"The CMER program/project ranking process goes on to describe the details of how to deal with various levels of scientific uncertainty and associated risks to listed species underlying FPHCP rules as a direct results of shortcomings in FFR negotiations (FPHCP, Appendix H, 2004)."

"These questions (above) *were chosen to rank programs because uncertainties and gaps exist in the scientific foundation for the FFR and the underlying assumptions about risks to aquatic resources. CMER was charged with reducing these uncertainties through effectiveness and validation monitoring and research and then recommending modifications to the rules as necessary through the adaptive management process. Uncertainty is a measure of confidence in the science underlying a rule, including the scientific relationships providing the conceptual foundation for the rule, the assumptions incorporated into the prescription, or the response to the prescription when it is applied on the ground. High uncertainty (low certainty) indicates that little is known about the underlying science and the rule is likely based on speculation and poorly informed assumptions. It may also indicate that the prescription treatment is untested, and the performance under field conditions is unknown. Low uncertainty (high certainty) indicates that the science underlying the rule is well known and accepted, or that the prescription (or similar treatments) has already been evaluated under similar conditions. Risk is a measure of the potential for detrimentally impacting aquatic resources and thus undermining the intent of the FFR goals, e.g. harvestable fish populations, stream associated amphibians, and water quality. A high-risk assignment indicates the rule component under study has a greater potential to alter the resource because of its high magnitude, frequency, and/or direct linkage to the resource. A low risk assignment indicates that the rule component has a lesser potential to alter the resource because of its low magnitude, frequency, and/or indirect linkage to the resource."*

CMER Forests & Fish Project Ranking 10-17-03

Effectiveness/Validation Monitoring Program & Projects	Scientific Uncertainty Total	Risk to Resource Total	Number Respondents	Average Scientific Uncertainty	Average Risk to Resource	Product	Ra
Type N Experimental Buffer Treatment	55	51	13	4.23	3.92	16.60	
Type N Buffer Chara., Integrity and Function Proj.	53	47	13	4.08	3.62	14.74	2
Road Sub-Basin-Scale Effectiveness Monitoring	46	51	13	3.54	3.92	13.88	3
SAA Detection/Relative Abundance Methodology Proj.	53	43	13	4.08	3.31	13.49	4
Type N WQ/downstream effects	52	42	13	4.00	3.23	12.92	5
Fish Passage Effectiveness Monitoring Project	42	47	13	3.23	3.62	11.68	6
Historical, Sustainable, and Future Stand Conditions	48	41	13	3.69	3.15	11.64	7
Buffer Integrity-Shade Effectiveness	43	37	12	3.58	3.08	11.05	8
Mass Wasting Prescription-scale Effectiveness Mon.	43	43	13	3.31	3.31	10.94	9
Effectiveness of Unstable Landform Identification	41	43	13	3.15	3.31	10.43	1
Eastside Type F Monitoring Add-on	40	41	13	3.08	3.15	9.70	1
Road Surface Erosion Model Validation/Refinement	38	36	12	3.17	3.00	9.50	1
Bull Trout Overlay Temperature Project	41	39	13	3.15	3.00	9.46	1
Type F Experimental Buffer Treatment	43	37	13	3.31	2.85	9.41	1
Historical, Sustainable, and Future Stand Cond. Followup	42	32	12	3.50	2.67	9.33	1
Type F Riparian Prescription Monitoring Project	38	40	13	2.92	3.08	8.99	1
Statewide Forested Wetland Regeneration Pilot & Proj.	42	35	13	3.23	2.69	8.70	1

Hardwood Conversion Project	38	38	13	2.92	2.92	8.54	1
Wetland Mitigation Effectiveness Project	40	36	13	3.08	2.77	8.52	1
Type N Performance Target Validation	40	31	13	3.08	2.38	7.34	2
Tailed Frog Literature Review & Meta-analysis	39	31	13	3.00	2.38	7.15	2
Road Prescription (Site-Scale) Effectiveness Mon.	32	37	13	2.46	2.85	7.01	2
Effectiveness of Identifying RMAP Priority Fixes	31	38	13	2.38	2.92	6.97	2
Mass Wasting Buffer Integrity & Windthrow Assess.	35	33	13	2.69	2.54	6.83	2
Type F Performance Target Validation	31	30	12	2.58	2.50	6.46	2
Dunns & van Dykes Salamander	37	25	12	3.08	2.08	6.42	2
LWD Literature Review	35	30	13	2.69	2.31	6.21	2
Wetland Management Zone Effectiveness Mon. Project	31	28	12	2.58	2.33	6.03	2
Mass Wasting Landscape-Scale Effect. Mon. Proj.	37	27	13	2.85	2.08	5.91	2
Wetland/Stream Water Temperature Interactions	37	26	13	2.85	2.00	5.69	3
LWD Literature Review Followup Studies	34	28	13	2.62	2.15	5.63	3
Development of Site-scale Road Mon. Field Protocols	31	29	13	2.38	2.23	5.32	3
RMZ Resample Project	34	25	13	2.62	1.92	5.03	3
Wetland Hydrology Connectivity Project	34	24	13	2.62	1.85	4.83	3
Groundwater Conceptual Model	34	21	13	2.62	1.62	4.22	3
Type N Classification	28	21	12	2.33	1.75	4.08	3
Chemical Application Monitoring Project	28	23	13	2.15	1.77	3.81	3

CMER Forests & Fish Project Ranking 10-17-03

Rule Tool Programs	Total Score	Number Respond-ants	Average Score	Rank
Last Fish/Habitat Prediction Model Development	18	14	1.29	1
Last Fish/Habitat Prediction Model Update & Validation	26	14	1.86	2
SAA Sensitive Site Identification Methods	29	14	2.07	3
SAA Sensitive Sites Characterization	27	13	2.08	4
Landslide Hazard Zonation	31	14	2.21	5
Vulnerability of DS Landslides to Timber Harvest	31	14	2.21	5
DFC Trajectory Model Validation	32	14	2.29	7
Region. Unstable Landfrm ID (Map/Deep-Seated Screen)	32	14	2.29	7
DNR GIS Wetlands Data Layer	33	14	2.36	9
Annual/Seasonal Variability Project	34	14	2.43	10
DFC Target Validation	34	14	2.43	10
Landform Hazard Class. System & Mapping Protocols	35	14	2.50	12
Model ET Changes to DS Landslide Recharge Areas	35	14	2.50	12
Perennial Stream Survey (Full Statewide Project)	35	14	2.50	12
Shallow Rapid Landslide Screen for GIS	35	14	2.50	12
Bull Trout Habitat Prediction Models	36	14	2.57	16
Bull Trout Presence/Absence Protocols	36	14	2.57	16
Technical Guidelines for Geotechnical Reports	36	14	2.57	16
Hydrogeomorphic Wetland Classification System	37	14	2.64	19

Accuracy & Bias in Identification of Unstable Landforms	32	12	2.67	20
DFC-Aquatic Habitat	39	14	2.79	21

Based on the fact that during their AMP project prioritization process (CMER 2003, CMER Work Plan, FPHCP Appendix H 2004) CMER found that many of the FPHCP rules/prescriptions had "high uncertainty in the confidence in the science underlying rule(s)", were "likely based on speculation and poorly informed assumptions", and as a direct result posed significant risks as "a measure of the potential for detrimentally impacting aquatic resources and thus undermining the intent of the FFR goals", it's very difficult to understand how the Services can view the base mitigation measures in the FPHCP as "sufficiently rigorous" to the extent that they (the Services) "may reasonable believe that they will be successful."

If it truly is "*against the Service's policies to accept known, significant errors in the initial mitigation strategy, and then use the adaptive management program to "correct" or improve them*", why did they fail to address many of the known and significant errors, and accompanying risk to aquatic resources, inherent in the lack of science underlying a significant portion of the FPHCP rules in their attempt to protect aquatic species? The CMER AMP project prioritization and ranking process and results exemplify the Services inability to adhere to their own standards concerning the Role of Adaptive Management and clearly demonstrate that the FPHCP base mitigation measures are not sufficiently vigorous for providing adequate upfront conservation measures.

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Comments to the "FEIS Response to Comments" (January 2006) on DEIS comments submitted by ARC Consultants.

The Adaptive Management Process (Section 3.5.3, FEIS 2006)

The Services failed to adequately respond to my comments concerning the "Structural Problems with the FPHCP Adaptive Management Program resulting from the Political Intervention of a Scientific Process." (for full comments to DEIS see attached Addendum).

The Services response reads:

9 Several commenters desired explicit "decision criteria" within the adaptive management
10 program. Some advocated "triggers" within the adaptive management program that
11 would provide stronger guidance to decision-makers on their response to research.
12 Several commenters were concerned that the adaptive management program opened the
13 door for an economic cost versus resource benefit analysis. At least one cited early drafts
14 of the adaptive management process guidelines for the Forest Practices Board Manual to
15 reinforce their concern.
16 The Services acknowledge that some research projects are of a nature that the range of
17 policy responses to the range of scientific outcomes can be predicted and reflected in
18 "triggers" or "decision criteria." However, the Services' believe that there are many
19 circumstances where the optimum policy response to a scientific investigation may
20 require further synthesis, deliberation, and consideration. This is particularly true where,
21 as with the FPHCP, the decision-making process includes the desire for consensus among
22 interests who may have differing initial views of the management actions necessary to
23 achieve the desired scientific outcome. It is the responsibility of the TFW/FFR Policy
24 Group and the varying interests it represents to evaluate scientific information forwarded
25 from the science-based CMER Committee in light of existing program goals, resource
26 objectives, and performance targets. Program goals include biological components (e.g.,
27 "... restore and maintain riparian habitat... "), cultural components (e.g., "... support a
28 harvestable supply of fish"), economic components (e.g., "... keep the timber industry
29 economically viable... "), and legal components (e.g., "provide compliance with the
30 Endangered Species Act... "). The TFW/FFR Policy Group and the Forest Practices
31 Board must evaluate the implications of CMER findings not only on the more
32 biologically-oriented resource objectives and performance targets, but also on the
33 cultural, economic, and legal aspects of the broader program goals. Therefore, position
34 advocacy at the TFW/FFR Policy Group and Forest Practices Board levels is not only
35 expected, but necessary given the complex and sometimes competing values embedded
36 within these goals.

The Services "belief that there are many circumstances where the optimum policy response to a scientific investigation may require further synthesis, deliberation, and consideration" is a perfect example of how the TFW/Policy group can elect to ignore, discard, and/or consciously modify the interpretation of CMER research results when weighing them against other FFR goals like "economic

components (e.g., "...keep the timber industry economically viable...") without further refining the definition of what economic viability means.

Under Policy petitions for amendments WAC 222-12-045 (2)(d)(vi) it states:

Upon receipt of the CMER report, policy will prepare program rule amendments and/or guidance recommendations in the form of petitions for amendment. When completed, the petitions and the original CMER report and/or other information as applicable will be forwarded by the program administrator to the board for review and action. Policy recommendations to the board will be accompanied by formal petitions for rule making (RCW 34.05.330). Policy will use the CMER results to make specific petitions to the board for amending:
(A) The regulatory scheme of forest practices management (Title 222 WAC rules and board manual);
(B) Voluntary, incentive-based, and training programs affecting forestry;
(C) The resource objectives; and(D) CMER itself, adaptive management procedures, or other mechanisms implementing the recommendations contained in the most current forests and fish report.

The WAC (222-12-045) does not state that *"It is the responsibility of the TFW/FFR Policy Group and the varying interests it represents to evaluate scientific information forwarded from the science-based CMER Committee in light of existing program goals, resource objectives, and performance target."*

The last two sentences in the Services response which state that Policy and the Forest Practices Board " *must evaluate the implications of CMER findings not only on the more biologically-oriented resource objectives and performance targets, but also on the cultural, economic, and legal aspects of the broader program goals.* And that, *"Therefore, position advocacy at the TFW/FFR Policy Group and Forest Practices Board levels is not only expected, but necessary given the complex and sometimes competing values embedded within these goals."*

This statement illustrates the key structural problem with having "competing values embedded within these (FPHCP) goals" with out independent scientific oversight of the TFW/FFR policy decision making process/outcomes and their implications for the continued conservation and maintenance of listed species under the FPHCP. In other words, if policy decides that the "biological components (e.g.,. restore and maintain riparian habitat)" are too costly when weighed against the "economic component (e.g.,. keep the timber industry economically viable)" they reserve the right not the petition the Forest Practices for a rule change, or to submit a petition that does not reflect or emphasize the importance of upholding the original FFR agreement to meet all science based resource objectives and performance targets outlined in Schedules L-1 and L-2 of the FPHCP (Appendix H).

Since my last round of comments to the DIES of the FPHCP (May 2005) there have been two examples of CMER research projects that have been presented to the TFW/FFR Policy group who in turn have responded with petitions for rule making to the Forest Practices Board. The AMP pathway and process that both of these projects passed through en route to the Forest Practices Board are excellent examples of how the TFW/Policy group may influence or attempt to modify the interpretation of CMER research results, and how economic costs to the timber industry may potentially trump the biological components of the FPHCP.

First, the *Validation of the Western Washington Riparian Desired Future Condition (DFC) Performance Targets In the Washington State Forest Practices Rules with Data From Mature, Unmanaged, Conifer-Dominated Riparian Stands,* a.k.a. the DFC study.

Background

The DFC Validation Study (Shuett-Hames et al. 2003) was ranked by CMER as "high priority" based on the lack of credible science underlying the current FPHCP riparian prescriptions for fish-bearing streams (Type S and F waters) and the resulting potential "high risk" to aquatic resources (CMER Work Plan, Appendix H, FPHCP 2005). Schedule L-1 and L-2 of the FPHCP (Appendix H) also shows that the DFC study was prioritized for the same reasons, and to be conducted within "two years" of the signing of the FFR (1999). In answering questions outlined in the CMER/Policy Interaction Framework document, CMER summed up the relevance of the DFC study as stated below:

"Project : Validation of Desired Future Condition (DFC) Riparian Basal Area Targets in Western Washington – Supplementary Data Collection Based on SRC Review of Initial Results"

FFR Relevance (questions 1 and 2)

"The DFC Validation study informs the DFC performance targets in WAC *222-30-0212 1b, which defines the basal area targets for harvest in the inner zone of western Washington riparian management zones. This study addresses a portion of question LWD1 from Schedule L-2 of the FFR, e.g. "Validate the desired future condition targets within two years of the report... Validate... data used to develop Desired Future Condition (DFC) targets... Conduct field reconnaissance of mature riparian reference stands and compare results with interim targets.)"

Concerning the quality of science underlying the current FPHCP DFC defaults still used in the Forest Practices rules the summary states:

Underlying Science Informed by Study (question 6)

"The negotiators who developed the original DFC performance targets were hampered by a lack of information on the characteristics of mature, conifer-dominated riparian forests in western Washington. Consequently, they relied primarily on data from upland forests, along with a very limited set of riparian data. There is much speculation as to whether riparian forests grow differently from upland forests and researchers have argued persuasively that they do and that they don't. Scant data has informed these opinions. The data upon which the current basal area targets are based was recognized to be problematic in a number of regards from the beginning and a requirement that this be verified by actual data insisted upon, and this target's status as an interim target made clear, even as this was set into rule in 2001."

The DFC study has followed the requirements of the AM Board Manual for CMER research outlined in the CMER Protocols and Standards Manual (CMER 2005) and been peer reviewed by the independent scientific review committee (SRC) and approved by CMER.

The DFC study results invalidated the current FPHCP basal area/acre targets for all WDNR Map Site Classes (except Site Class 1 due to only one field site) as illustrated by the figures below in Table 6 taken from the DFC Study (Shuett-Hames et al. 2005).

Table 6. Comparison of estimated mean LCBAPA to DFC targets by map site class.

Map Site Class	DFC Target (basal area in ft^2/acre)	Estimated Mean LCBAPA (ft^2/acre)	Difference (estimated-target in ft^2/acre)	t-test P-value	Percent sites with LCBAPA ≥ DFC Target
I	285	264.2[a]	- 20.8 ft^2 [a]	NA[a]	0.0%[a]
II	275	333.8	+ 58.8 ft^2	0.003*	66.7%
III	258	307.7	+ 49.7 ft^2	0.003*	79.3%
IV	224	353.1	+ 129.1 ft^2	<0.001*	100.0%
V	190	341.0	+ 151.0 ft^2	<0.001*	100.0%

*Significant difference from DFC target. [a]There was only one site for map site class I.
Shuett-Hames et al. 2005

At the request of the TFW/FFR policy group, several CMER members and support staff held a DFC Workshop (DFC Workshop notes 2005) to help inform the TFW/FFR group of the DFC study findings with implication for potential rule changes to assist with their decision making process prior to formulating a petition to the Forest Practices Board. The DFC Power Point presentation given to Policy and the meeting minutes from the DFC workshop are included with supporting documents submitted on Compact Disk (CD).

Prior to and following the DFC Workshop, a policy sub-group was formed (chaired by Bob Turner of the NOAA) with the intent of formulating a recommendation to the larger FFR policy group who would then pass that recommendation along to the Forest Practices Board in the form of a petition for rule making. During the sub-policy group meetings stakeholders discussed the implications of attempting to meet conflicting FPHCP goals; specifically, trying to balance the biological components (in this case changing the rule to reflect CMER research which indicates that riparian habitat is not being maintained or restored under the current FPHCP rules) with the potential economic costs to the timber industry. This issue was never resolved as evidenced by the ambiguity in the resulting rule language that was proposed by the DFC sub-policy group co-chair (Bob Turner, NOAA).

The rule language in the recommendation states that (WDNR memorandum, August 30 2005):

The DFC study:

- shows that basal area per acre of mature, unmanaged conifer-dominated riparian stands is significantly different from the values used in the rule.
- could not demonstrate that basal area per acre of mature, unmanaged conifer-dominated riparian stands is significantly different by site class. The current rules establish that basal area targets are different by site class.
- suggests that site class identification maps are inaccurate. If true, management for properly functioning conditions could likely be compromised by application at any particular site of an inappropriate riparian buffer width.

Policy recommends that the Forest Practices Board consider rulemaking by investigating the scope of potential outcomes to resolve the issues identified by the DFC study. This would entail filing a CR 101.

Policy is committed to continue to work to determine a full renge of alternative approaches to the issues presented by the DFC study. Exactly what portion of, or to what extent, the rules would be changed is the basis of this recommendation to commence a scoping exercise.

The last two paragraphs is where the TFW/FFR Policy Group has reserved the right to "determine a full range of alternative approaches to the issues presented by the DFC study." And that "Exactly

what portion of, or to what extent, the rules would be changed is the basis of this recommendation to commence s scoping exercise." Policy was fully briefed by CMER on the DFC study results (via the Policy/CMER Interaction Framework document and the DFC Workshop) which indicate that the DFC targets in the existing FPHCP rules governing riparian protections on fish-bearing waters are invalid. There were other issues and questions raised by the DFC study results concerning the accuracy of WDNR's Site Class maps, however, they have no bearing on whether or not the DFC targets should be changed. This was clearly articulated by CMER staff during the DFC workshop (see DFC Power Point presentation "DFC_Study2" 2005).

In this particular case FFR Policy has failed to uphold the "biological component" of the FPHCP by failing to recommend that the FPB adopt the new CMER approved, SRC reviewed, DFC targets that were deemed high priority in Schedules L-1 and L-2 of the FPHCP (Appendix H) and by CMER's AMP prioritization process. The ambiguity in the petition for rule making language to the FP Board clearly illustrates the ability of the FFR Policy group to discount CMER research results for the purpose of providing science-based recommendations to the Forest Practices Board based on the potential impacts to the "economic component (timber industry viability)".

The second example of FFR Policy recommendations for a petition for rule change to the Forest Practices Board relate to the Type N Stream Demarcation Study (Palmquist 2003). The recommendation also considered the results of a Tribal Type N Demarcation Study (Pleus and Goodman 2003) that supplemented the Palmquist (2003) study.

Both studies found that the current FPHCP defaults used to determine the demarcation between Type Np waters (perennial) and Type Ns waters (seasonal) were grossly inaccurate and exceeded the study's findings by close to 10 fold (see table below). In answering one of the 6 questions in the CMER/Policy Interaction Framework document concerning the CMER study conclusions, UPSAG states (see addendum for the full CMER response):

"What does the study tell us? (question 4a)
The Phase 1 Study achieved its four objectives:

1. *Assess the adequacy and replicability of the pilot protocol:* The Phase 1 protocol was found to be adequate for identifying the Np/Ns break and repeatable in a Phase 2 study with appropriate oversight and protocol modifications.
2. *Assess the variability of basin areas and other parameters*: The variability of basin areas was determined within default regions and precipitation zones. These data were used to estimate sample sizes required for the Phase 2 statewide study.
3. *Assess basin and channel attributes that are potentially useful in defining the Np/Ns break*: Channel and basin attributes were measured and tested; none of the targeted attributes were found useful for consistently identifying the Np/Ns break on the ground.
4. *Refine protocols for the statewide study*: Modifications important to a Phase 2 study would include revising the study design and sampling protocols to include but not limited to: surveying to the channel head, random tributary selection during the survey, expanding parameters for associated channel attributes, and consideration of the SRC recommendation to use other, more easily identifiable indicators of perennial flow initiation other than basin area. If Phase 2 is approved by policy, the field protocols will be refined accordingly."

"The Phase 1 results provided additional insights into the characteristics of Type N streams that were unanticipated during the planning phase:

- The observed basin areas are much smaller than the default basin areas (medians roughly one-eighth) as summarized in the following table. "

Region	Default Area (acres)	Phase 1 Observed Basin Areas		
		Median	Average	Sites
Eastern Wash.	300	36	118	43
Western Wash.	52	6	22	152
Coastal zone*	13	2	8	18

* Coastal zone sites are in a portion of Western Cascades region within close proximity to Coastal zone boundary.

- **"Distances from channel head to the Np/Ns break are generally very short (the regional median lengths are 2 to10 m), which indicates that Np waters begin at or near the channel head of most study streams. The close proximity between the channel head and the Np/Ns break indicates the channel head is a reliable and repeatable field indicator of the Np/Ns break.**
- Distance from the basin divide to the Np/Ns break has less variability than basin areas. Distance from the basin divide is potentially a better mapping indicator of the Np/Ns break than basin area.
- Average annual precipitation is potentially a better basis for stratifying differences in the Np/NS break than the current default regions."

In their recommendation to petition the FP Board for rule making, the PIP Policy sub-group stated (WDNR memorandum August 16, 2005):

> In accordance with WAC 222-12-045, Forests and Fish Policy is petitioning the Forest Practices Board for rule making as a part of the process of the Adaptive Management program.
>
> In light of the CMER study results indicating that the existing default basin sizes available for use in determining stream perennial initiation points (PIP) are incorrect, Forests and Fish Policy recommends to the Forest Practices Board that the default be eliminated. The rule language in WACs 222-16-030(3) and 222-16-031(4) that provides default basin sizes should be replaced with language that refers landowners to Board Manual Section 23 to locate PIPs in the field. Please see the attached recommended rule language. Forests and Fish Policy recommends rule making as soon as practicable.
>
> As implied in the rule making proposal, Forests and Fish Policy also recommends that coincident with rule adoption, the Forest Practices Board approve a board manual (Section 23) describing simple non-technical methods for identifying PIPs. The board manual should include guidance on seasonal issues, how PIPs will be identified when landowners do not have legal access to PIPs, and when it may be necessary to consult with DNR Forest Practices field staff. Forests and Fish Policy will provide guidance for the development of the board manual.
>
> In addition, Forests and Fish Policy recommends that, prior to the effective date of the rule change, DNR encourages landowners to make a good faith effort to locate PIPs in the field, consistent with current rule language for Type Np and Type 4 Waters, prior to accepting FPAs that rely upon the default basin sizes.

In this case FFR Policy decided to recommend replacement of the current FPHCP default basin sizes with an updated version of the FP Board Manual Section 23 that is currently being developed. However, they chose not to replace the current defaults with a new default based on the CMER study which found that "Distances from channel head to the Np/Ns break are generally very short (the

regional median lengths are 2 to10 m), which indicates that Np waters begin at or near the channel head of most study streams. The close proximity between the channel head and the Np/Ns break indicates the channel head is a reliable and repeatable field indicator of the Np/Ns break."

Shortly after the CMER Type N Demarcation study (Palmquist 2003) and the Tribal study (Pleus and Goodman 2003) were completed, FFR Policy directed CMER to calculate the potential length of Type Np channels that would be affected by a FP rule change that reflected the CMER study results (Palmquist 2003). The details of the results are included in the attached Addendum. Table 3. below illustrates that current use of the FPHCP Type Np/Ns defaults (and since FFR was adopted in 1999) are resulting in the under protection of thousands of feet of Type Np streams within a single headwater basin. When taken cumulatively and applied to the FFR landscape over the past 7 years, use of the existing FPHCP defaults have resulted in the lack of protection (no riparian buffer) on at least hundreds, and potentially thousands of miles of Type Np waters across Washington State. A thorough review of FPAs since FFR was implemented (1999) would reveal a more accurate estimate.

Table 3: Summary of estimated lengths (in feet) of affected reaches by FFR default region.
The regression estimates the FFR distance from the default basin area. The estimate is the average which back transforms to the median of the arithmetic (observed) distribution. The median difference is the most appropriate measure of the "affected length."

FFR Default Region	Difference between FFR Distance and Observed Distance	
	Median (feet)	Average (feet)
Eastside	3,319	2,512
Westside	1,263	932
Coastal	564	456

The main purpose of having a Type Np/Ns default in the FP Board Manual is to serve as a substitute for forest landowners that have difficulty in correctly identifying the point of perennial initiation (a.k.a. PIP) in the field, and during the wet season when the PIP cannot accurately be demarcated by foresters and landowners. Hopefully, FP Board Manual Section 23 that is currently under revision will include a default in the methods for identifying the Type Np/Ns break reflecting CMER research results and other supporting research (e.g., Tribal Type N Demarcation Study and others listed in Table 2. of the CMER/Policy Interaction document included in the attached Addendum) to the extent that Type Np waters will be protected as initially envisioned under the Forest and Fish Report and now the FPHCP.

Summary and Conclusions

CMER's role in the FPHCP is clearly outlined in the Adaptive Management Board Manual (Appendix H, FPHCP 2005) and described as:

"The Washington Forest Practices Board (FPB or "Board") has adopted an adaptive management program in concurrence with the Forests and Fish Report (FFR) and subsequent legislation (ESHB 2091). The purpose of this program is to"

> "provide science-based recommendations and technical information to assist the board in determining if and when it is necessary or advisable to adjust rules and guidance for

aquatic resources to achieve resource goals and objectives. (Forest Practices Rules, WAC 222-12-045)"

"To provide the science needed to support adaptive management, the FPB made the Cooperative Monitoring, Evaluation and Research Committee (CMER) a participant in the program. The FPB empowered CMER to conduct research, effectiveness monitoring, and validation monitoring in accordance with guidelines recommended in the FFR."

Independent scientific review of CMER AMP projects that have implications for potential rule changes in response to achieving key resource objectives and performance targets outlined in the FPHCP is required under the CMER Protocols and Standards Manual (2005) and the Forest Practices Adaptive Management Board Manual (2005). However, there is no similar requirement designed to oversee the results of the FFR Policy or the FPB decision making process when responding to important CMER research.

With out an independent scientific oversight committee to evaluate FFR Policy and FPB decisions (or lack there of) in response to CMER research generated through the AMP, the FFR Policy group and the FPB can essentially rewrite the FPHCP resource objectives and performance targets by weighing them against potential economic costs to the timber industry. That's not to imply that the economic component of the FPHCP isn't important, as its listed as one of the four main FPHCP goals. Rather, the purpose of this type of independent scientific oversight committee would insure that the implications and consequences of FFR Policy recommendations and subsequent FPB actions, as they relate to achieving FPHCP resource objectives and performance targets outlined in Schedules L-1 and L-2 (Appendix H, FFR HCP), would be evaluated on the basis of how such decisions will likely impact the success of the FPHCP in protecting and maintaining listed species. This type of technical evaluation is presently being conducted by ad-hoc FFR Policy members and the FPB who are not trained or qualified to do so.

Experience and well trained professionals in conservation biology, forest and salmon ecology, and forest landscape processes are much more qualified, and should be required to conduct these types of highly technical evaluations that may ultimately impact the overall success of the FPHCP. The FFR Policy group and the FPB would be better served by this type of oversight committee than a group of ad-hoc policy representatives. The timber industry would be equally served by an independent economic oversight committee to help further refine the definition of "timber viability". Without such oversight, it will be difficult if not impossible to accurately quantify the potential impacts of FFR Policy and the FPB's "balancing" of competing goals to the success of the FPHCP.

As an example, what if the FFR Policy group decides not to change the DFC targets due to economic considerations (e.g., the timber industry deems itself to no longer be viable if the DFC rule is changed to reflect CMER science)? How will that impact the ability of the FPHCP to achieve its resource objectives and performance targets outlined in Schedules L-1 and L-2? Will forgoing the protection, restoration, and maintainance of riparian areas on fish-bearing waters, because it's too costly, jeopardize those species listed for protection? These are questions that cannot be adequately addressed or answered by the FFR Policy group or the FPB without the assistance of an unbiased, independent scientific oversight committee.

Finally, if the FFR Policy group and the FPB fail to act on the first two "high priority" AMP CMER research projects (the DFC Study and the Type Np Demarcation Study), specifically designed to inform FFR rules that CMER determined were based on very little science and pose a potential "high risk" to aquatic resources, how can the public have confidence in the structural integrity and consequently, the effectiveness of the AMP process in protecting,

restoring, and maintaining FPHCP listed species? More specifically, if the FFR Policy and FP Board's response to important CMER research results does not reflect corresponding rule changes designed to protect aquatic resources as outlined in the FPHCP, than the AMP will have failed.

As stated in the FPHCP AM Board Manual, the purpose of the FFR AMP is to "provide science-based recommendations and technical information to assist the board in determining if and when it is necessary or advisable to adjust rules and guidance for aquatic resources to achieve resource goals and objectives. (Forest Practices Rules, WAC 222-12-045)". FFR forest practices have been (since 1999), and are currently operating under several rules that are clearly based on inadequate and incomplete science (CMER Work Plan, Appendix H, FFHCP) to the detriment of aquatic resource protection. CMER's completion of the DFC Study (Shuett-Hames et al. 2003), the Type N Demarcation Study (Palmquist 2003), and additional supporting research (Table 2. attached Addendum) provide the FFR Policy group and the FPB with the opportunity adjust these rules such that they to reflect the findings of the best available science. This action is both necessary and advisable in order to achieve aquatic resource goals and objectives under the FPHCP.

ADDENDUM

Chris Mendoza
1st round of Comment to FFR HCP Adaptive Management Program Final.

Background on Adaptive Management

The Washington Forest Practices Board (FPB or Board) has adopted an adaptive management program in concurrence with the Forests and Fish Report (FFR) and subsequent legislation (ESHB 2091). The purpose of this program is to:

> provide science-based recommendations and technical information to assist the board in determining if and when it is necessary or advisable to adjust rules and guidance for aquatic resources to achieve resource goals and objectives. (Forest Practices Rules, WAC 222-12-045)

To provide the science needed to support adaptive management, the FPB made the Cooperative Monitoring, Evaluation and Research Committee (CMER) a participant in the program. The FPB empowered CMER to conduct research, effectiveness monitoring, and validation monitoring in accordance with guidelines recommended in the FFR.

The adaptive management process is a continuous loop. It involves the FPB, a policy group (the TFW Policy Committee, the FFR Policy Group, or a similar group), the adaptive management program administrator (AMPA), CMER, and a process for independent scientific peer review (SPR), commonly called the SRC (for "scientific review committee") responsible for reviewing CMER related research projects. The AMPA, an employee of the Washington Department of Natural Resources (DNR), administers the entire process. (CMER Protocol and Standards Manual 2005).

Structural Problems with the FPHCP Adaptive Management Program resulting from the Political Intervention of a Scientific Process.

The FPB is largely made up of members without scientific expertise in forestry/fishery interactions and other aquatic resource and wildlife related habitat management issues. Members include the Public lands commissioner, state natural resource management agency representatives, forestland owners, and government appointment community members (4a. Draft FPHCP 2004). The Board's decision making process is conducted without direction or guidance from of an independent scientific review or oversight committee. CMER however, is required to have key AM projects and reports peer reviewed by a scientific review committee (CMER PSM 2005). This lack of scientific oversight at the FPB and Policy levels allows the Board to pass all CMER AM research through a political / socio-economic lens prior to consideration of potential forest practices rule changes in response to recently generated, CMER approved AM research.

Kepkay (2003) and other adaptive management professionals (Salafsky et al. 2001, Meyers 2001, Walters 1997, Adams and Hairston 1996) have also documented structural problems inherent in natural resource management AM programs that omit scientific and technical expertise from key management levels that direct important decision making processes influencing habitat management and conservation policies and practices. Other systemic problems can result from the unregulated political influence on scientific processes designed to operate free of political decision making processes (Kepkay 2003, Adams and Hairston 1996).

In a detailed review of the Complexity of Adaptive Management in Washington State Forest Policy 1987-2001, Kepkay (2003) documents several important structural problems with the "Forest and Fish Report as scientific adaptive management."

"Given the highly contradictory participant evaluations of the new rules, reducing future conflict may depend heavily on the adaptive management provisions of FFR (USFWS et al. 1999). Tribal and ENGO representatives claim that throughout the 1990s, industry was able to block valuable new rules proposals in TFW Policy (Section 7.2.2). Consequently, during the FFR negotiations these groups demanded a detailed formal system of research, policy feedback, and dispute resolution – assurance of more transparent and reliable implementation. In particular, calls for a more rigorous "firewall" between ecosystem science and policy decisions are heard frequently..." And that; *"Significant rule changes will probably be slow in coming – trends in processes like LWD recruitment may take many decades to detect, yet resources for a rigorous monitoring and evaluation process are limited and will almost certainly vary over time. To date (mid-2003), four years after the Forests and Fish Report, CMER still is occupied as much by the details of formal structuring and process for implementing the program as by carrying out research and feedback to TFW Policy."*

This last statement is evidenced by the CMER Desired Future Conditions (DFC) project (Schuett-Hames et al. 2003) which, despite being prioritized in Schedule L-1 of the Forest and Fish Report as "priority" research to be conducted "within 2 years" of the signing of FFR (1999), was just completed (2005) and handed to Policy for consideration to forward to the FPB. This particular project was given high priority because it validates current FFR rules regulating riparian buffers on fish bearing waters that were based on very little science. In this particular case, the DFC targets regulating timber harvest were invalidated by CMER research for all fish-bearing waters (Site Class I,II,II,IV,V). FFR Policy has since taken up deliberation of the DFC results to consider the potential economic impacts to the timber industry of a potential rule change. Other priority CMER studies (Palmquist 2003) designed to validate specific FFR rules designed to protect aquatic species (referred to as rule implementation tools, or simply rule tools), but were based on very little science, are also presently being deliberated by Policy for the same reasons; political and economic implications for the industry.

Federally approved HCP adaptive management programs should insure that political decisions that weigh AM research and monitoring results with economic implication, be further evaluated by

independent scientific review, particularly if those decisions result in changes to habitat conservation provisions that effect the protection and long-term viability of listed species. As an example: the Federally approved Simpson Timber Co. HCP (2000) adaptive management program has specific language directing the AM decision making process that requires review from an external scientific advisory team. Under "Threshold Triggers for Opening Adaptive Management Discussions" the Simpson HCP states:

"*Upon initiation of any adaptive management discussions, the scientific advisory team (Section 14) will be contacted and provided with the proposed revisions to prescriptions and the information which may bear on such modification. Simpson and the Services* (NOAA, USFWS, EPA) *will consider the input of the scientific advisory team in good faith when deciding whether or not to implement any adaptive management changes.*"

There is no such scientific advisory team providing oversight to the FPB to safeguard against the potential political influence on a scientific process (CMER) that could potentially undermine habitat conservation provisions in the HCP. Rather, the FPB receives guidance from another political body (the Policy committee) which formulates AM recommendations, also without independent scientific oversight. Under chapter 4a. of the Draft FFR HCP, Forest and Fish policy is directed:

FF Policy makes recommendations to the Board regarding CMER Committee priorities and projects, final project reports and forest practices rule and/or guidance amendments. FF Policy membership is self-selecting and generally includes the state departments of Natural Resources, Fish and Wildlife and Ecology; Federal agencies (including NOAA Fisheries, USFWS, EPA and the USDA Forest Service); forest landowners; tribes; local governments; environmental interests and the governor's office.

The lack of independent scientific oversight of the Policy decision making process threatens to undermine the scientific credibility of the adaptive management program.

The Policy/ CMER Interaction Framework document.

The FFR Policy/CMER Interaction Framework document (FFR Policy 2004) is evidence of Policy's attempt to influence a scientific process by screening AM research results based on "cost/benefit analysis" and additional "feasibility" studies. This document (CMER/Policy Interaction) allows Policy to operate and make decisions without oversight from an independent scientific review of the implications of such decision on changes to habitat conservation provisions. Without specific "triggers" or contingencies built into the FFR Adaptive Management program that determine when a forest practice rule change needs to occur, Policy and the FPB are free to wield political influence on a science based AM program.

As quoted above (chapter 4a), FFR Policy receives and reviews reports from CMER and decides whether or not to make recommendations to the FPB based on their interpretation of AM results, additional cost benefit analysis, and whether or not a specific report warrants a forest practices rule change. The CMER/Policy Interaction Framework document is designed the help inform Policy of the potential resource and economic implications of CMER research results (FFR Policy 2004). At this critical point in the AM process there is still no independent scientific oversight providing guidance to Policy as they develop recommendations to the FPB which may or may not affect habitat conservation provisions under the FPHCP.

The most obvious AM structural problem with this part of the AM process is that it allows FFR Policy to consider specific "petitions for amendment" for a particular rule change to the FPB after weighing the potential economic impacts to the timber industry. No where in the Adaptive

Management Board Manual (2004) or the Draft FPHCP (2004) does is state that FFR policy has such authority. Under Policy petitions for amendments WAC 222-12-045 (2)(d)(vi) it states:

Upon receipt of the CMER report, policy will prepare program rule amendments and/or guidance recommendations in the form of petitions for amendment. When completed, the petitions and the original CMER report and/or other information as applicable will be forwarded by the program administrator to the board for review and action. Policy recommendations to the board will be accompanied by formal petitions for rule making (RCW 34.05.330). Policy will use the CMER results to make specific petitions to the board for amending:
(A) The regulatory scheme of forest practices management (Title 222 WAC rules and board manual);
(B) Voluntary, incentive-based, and training programs affecting forestry;
(C) The resource objectives; and(D) CMER itself, adaptive management procedures, or other mechanisms implementing the recommendations contained in the most current forests and fish report.

Again, no where in the FPHCP (2004), FFR Adaptive Management Board Manual (2004), or Forest Practices Board Manual (2001) does it instruct FFR Policy to conduct additional cost / benefit analysis or feasibility studies of CMER research. Through their newly developed and currently implemented Policy/CMER Interaction Framework document, Policy has over-stepped their authority in the forest practices rule making process by proposing these types of additional "analyses". Under the guidance of the Policy/CMER Interaction Framework, if the results of such analyses are found to be too costly for landowners then Policy grants itself the authority to propose changing related FPHCP Performance Targets required for meeting previously agreed to Resource Objectives under Schedules L-1 and L-2 of the FPHCP. Policy has essentially reserved the authority to re-write the FPHCP rules and regulations governing forest practices by way of modification to previously agreed to Performance Targets and Resource Objectives.

Below are Policy Options to CMER research taken from Table 1. of the latest version of the Policy/ CMER Interaction Framework document that is currently in use by the AM program (24 June 04).

Policy	options	7. Should any action be taken at this time, in response to the information that CMER has provided?
		8. What are the alternative courses of action, each of which would be an appropriate management response to the information that CMER has provided?
		9. What are the resource benefits and costs of each alternative? How feasible is each alternative from operational and regulatory perspectives?
	decision	10. Will Policy make a consensus, adaptive management recommendation to the board? If so, which alternative will Policy recommend?

Adaptive management alternatives and recommendations considered by Policy may work at two different levels (Table 3). "Rule tool" studies and effectiveness monitoring normally influence prescriptions. However, in order to meet all four goals of FFR, it may sometimes be necessary to consider changes to performance targets in response to these types of studies. Changing performance targets in response to rule tool studies will be considered only as a last resort, when it is not possible to change the relevant prescription(s) while meeting all four goals of FFR and either

the incremental gain in knowledge represented by the study is high (question #6) or the benefits or costs of action are high (question #9).

The four FFR goals listed in the Forest and Fish agreement and the Policy/CMER interaction document are:

1. to provide compliance with the Endangered Species Act for aquatic and riparian-dependent species on non-federal forest lands;
2. to restore and maintain riparian habitat on non-federal forest lands to support a harvestable supply of fish;
3. to meet the requirements of the Clean Water Act for water quality on non-federal forest lands; and
4. to keep the timber industry economically viable in the State of Washington.

The last goal concerning the economic viability of the timber industry is not well defined anywhere in the FPHCP, but is used as a mechanism in Policy's decision making process in consideration of potential forest practice rule changes in the Policy/CMER Interaction Framework. In Kepkay's (2003) review of adaptive management in Washington State forest policy 1987-2001, he recommends a more transparent examination of timber values to insure a more accurate assessment of timber value / habitat conservation trade-offs:

"The move towards scientific adaptive management should include expanding cooperative research and policy evaluations to include systematic and transparent analysis of timber value trade-offs against other socio-economic and ecological components of forest management problems. This is a near-impossible step to take without dramatic increases in available resources, yet it is a major gap in collaborative policy analysis practices in the case. There has been little transparent information about timber values and other trade-offs in the Watershed Analysis prescription phase or in other arenas. As a result, formal policy evaluations have been unable to provide any policy feedback with regard to one of the major goals of both TFW and Watershed Analysis."

The FPHCP suffers from the same lack of "systematic and transparent analysis of timber value trade-offs" to assist policy in their decision making process resulting from the CMER adaptive management program as no form of transparent analyses have ever been conducted. At present, the process for defining and determining when timber industry economic viability is being met, or not, is left to the sole discretion of the industry. Under the Policy/CMER Interaction Framework this informal process is then folded into Policy's decision making process used to determine whether FPHCP performance targets and resource objectives, as outlined in Schedules L-1 and L-2 of the FFR, should be changed to accommodate potential economic impacts to the timber industry. This essentially allows Policy to re-negotiate the initial FFR "deal" before presenting CMER results to the FPB.

Comments to the Policy/CMER Interaction Framework Document.

During the development of the Policy/CMER interaction framework document (2004) Policy proposed "Changing performance targets in response to rule tool studies will be considered only as a last resort". Rule tools (rule implementation tools) are defined in the FPHCP under the CMER work plan (Appendix H, Draft FPHCP) as:

The development of rule implementation tools includes efforts to develop, refine or validate methods, guidelines, protocols, models or targets required to implement forest practices rules. Typical projects

include the development, testing, and refinement of field protocols or models to identify or delineate landscape features requiring FFR prescriptions.

By definition, rule tools are designed to implement previously agreed to forest practice rules and regulations under the FPHCP. Again, changing FPHCP performance targets in response to rule tool studies based on informal economic analyses conducted solely by the timber industry, in isolation of other FFR stakeholders, is essentially renegotiating the initial Forest and Fish Agreement.

The following is a response to the Framework for Policy/CMER Interaction document (currently in use by CMER and Policy) proposing to change FPHCP performance targets based on completed CMER and SRC reviewed AM rule tool studies.

1. CMER Rule Tool studies are not subject to consideration for changes in Performance Target Measures based on the economic implications of enforcing a previously agreed upon forest practices rule or regulation.

Schedule L-1 of the Forest and Fish Report (DNR 2000) specifically lists Rule Tools like DFC as "Priority Research" because of the very limited quantity and quality of science underlying the current FFR riparian prescriptions for fish bearing (Type F) waters. This is well documented in "Westside RMZs and the DFC Model: Documentation of Their Conceptual and Methodological Development" (TFW-RSAG-1-01-001, 2001). Mike Parton of the NMFS (now with Stillwater Consulting) was "adamant about doing follow-up work to validate the basal area targets that were eventually adopted" as FFR riparian prescription, as were other FFR stakeholders.

Parton and others have already determined that there is a high risk to aquatic resources under current FFR riparian prescriptions regulating timber harvest near fish bearing streams based on high uncertainties and significant gaps in the science underlying the rules and regulations. CMER also acknowledges this in the Proposed CMER Technical Ranking Process (2003) for prioritizing research programs and projects under the Forest and Fish Adaptive Management Program. Under 3c and 3d (Figure 2) of the CMER Ranking process (2003) "Pathways for identifying adaptive management projects within rule groups" (page 4) the instructions for addressing Rule Tools state that:

"Identify all projects designed to investigate the science or test the assumptions behind the rules. Projects in this category are those intended to reduce an unacceptable degree of uncertainty that affects public resources or landowners. Results of these projects could possibly lead directly to a rule change recommendation irrespective of effectiveness monitoring results."(page 7). And that, "Where large uncertainties exist in the underlying assumptions (of a rule), it may be advisable to investigate to reduce those uncertainties prior to embarking on an expensive monitoring program of a flawed rule".

Rule tools prioritized in the CMER work plan include the DFC (Desired Future Condition) basal area/acre targets established for FFR riparian prescriptions on Type F streams, Type N Stream Demarcation, Stream Typing Model development, Unstable Landform Identification, and other projects identified by CMER as having *"Major uncertainties in our confidence that FFR will achieve the resource objectives."* (CMER 2003). The research results from the DFC rule tool study inform the FPHCP rules governing riparian prescriptions on Type F waters that significantly lowers the high level of uncertainty underlying the rule and consequently, the risk to fish bearing streams. Policy's self imposed prerogative to change Performance Target measures based on rule tool study results that economically disfavor landowners fails to recognize the rationale for prioritization of the DFC project under Schedule L-1.

Moreover, if the intent of the FFR Adaptive Management Program was to have Policy pass all rule tool study results through the filter of "resource effects" and "economic analyses" there would be absolutely no reason to list rule tools in Schedule L-1 to begin with. That is, what Schedule L-1 does *not* state is that once rule tool studies are conducted by CMER, that better inform FFR rules and regulations in addressing significant uncertainties in the science underlying a given rule, that Policy then filter those research results through the lens of resource effects and economic implications to landowners. Those are important issues, but clearly separate from rule tool development as outlined in Schedule L-1 of the FPHCP, and well outside the authority of Policy as stated in WAC 222-12-045.

2. The Policy/CMER Interaction Framework undermines the scientific credibility of the FFR Adaptive Management Program by allowing a political body to co-opt a scientific process.

The purpose of CMER is to advance the science needed to support adaptive management (WAC 222-12-045). In doing so, CMER is responsible for conducting a credible, science based Adaptive Management Program whose research programs and projects are not subject to political influences responding to the economic implications of research results. Such political influence could easily undermine the credibility of the AM program by giving Policy the authority to selectively choose which projects to support and not support. In other words, they could choose not to support CMER research that forecasts potential high economic costs for landowners. A "lets not study it if it's going to cost us" approach. That's not to imply that economic implications are insignificant, but that they must be dealt with in a separate arena outside of a science based adaptive management program.

Attempting to recycle rule tool study results back into the FPHCP Adaptive Management Program for political or economic reasons undermines the credibility of the program by second guessing the intent of Adaptive Management as outlined in Schedules L-1 and L-2 (WDNR FFR, 2000). Furthermore, the Policy/CMER Interaction Framework document usurps regulatory authority from the Forest Practices Board by allowing Policy to pick and choose which CMER research projects are "worthy" of Petitions for Amendment to existing FFR rules and regulations, and which are not. Once CMER and the Adaptive Management Administrator have forwarded a technically sound, science based Adaptive Management Report to Policy that informs an FFR rule which directly results in a decreased risk to aquatic resources, it is the responsibility of Policy to inform the Forest Practices Board who ultimately makes the decision on rule making WAC 222-12-045(2)(d)((vii).

3. The Policy/CMER Interaction Framework is inconsistent with Policy discussion outlined in the minutes from the April 1, 2004 meeting and FFR Schedule L-1.

During the above FFR Policy meeting it was agreed to by several stakeholder groups (Conservation Caucus, Tribal Caucus) and NOAA (Bob Turner) that rule tools determined whether a "metric was right or wrong" and that resource effectiveness determined "whether the metric is a good indicator of what fish need" and that "the two are not linked." (April 1, 2004 Policy meeting minutes). Rule tools determine a previously agreed upon level of protection that "depends on identifying points on the ground and sometimes those measures need to be improved." This is also outlined in FFR Schedules L-1 and L-2.

Both the DFC study (Schuett-Hames et al. 2003) and the Type N Demarcation study (Palmquist 2003) are listed in Schedule L-1 of the FFR as research that will need to be prioritized to help better inform FFR forest practices rules that were negotiated with very little supporting science. These studies, and several others, have been previously determined through the CMER program ranking

process as posing high risk to aquatic resources precisely because there was high uncertainty in the science underlying the FFR rules.

The Policy/CMER Interaction Framework document ignores previous discussions and acknowledgments addressed at earlier Policy meetings; determining whether a "metric is right or wrong" should not be linked to "whether a metric is a good indicator of what fish need". These metrics or rule tools are the starting points that provide a baseline under which determining "what fish need" is conducted through effectiveness and additional validation monitoring.

4. The Adaptive Management Program can not be implemented and conducted as intended under the FFR without first establishing a baseline of riparian prescriptions via FFR rules and regulations.

A scientifically credible research and monitoring program must first establish a baseline consisting of "prescriptions" (rules and regulations) and "outcomes" (resource objectives) which determine how and where land and water use practices will be conducted across the landscape, and what impacts those practices will have on intended resources, respectively (MacDonald et al. 1991; Schuett-Hames et al. 1994; Bauer and Ralph 1999; Karr and Chu 1999; WDNR 1995; Simpson Timber Co. 2000). The FPHCP establishes specific resource goals and objectives which it intends to achieve through a conservation planning process that is primarily based on riparian prescriptions. Until the initial riparian prescription baseline is well established via regulatory mechanisms (FFR rules and regulations), CMER can not begin the process of determining whether resource objectives and performance targets (as outlined in Schedules L-1 and L-2 of the FFR) are being achieved through compliance, effectiveness, and validation monitoring.

If FPHCP riparian prescriptions are going to change as a direct consequence of CMER research results that inform the science underlying an FFR rule (particularly when very little science was available during the development of that rule), those changes need to made be made immediately to insure that related effectiveness and validation monitoring projects can be adjusted accordingly. FFR defaults are currently being used as the targets under which the majority of FFR AM research is being developed to the tune of millions of dollars per year. Many of those studies will all have to be redesigned and/or recalibrated and implemented to reflect rule tool changes in order to determine whether FFR resource objectives and performance targets are being met. As the process currently stands, the implications of the DFC (Schuett-Hames et al. 2003) and Type N Demarcation (Palmquist 2003) project results indicate that related effectiveness AM projects (i.e. are the prescriptions effective in achieving the desired outcomes) may not be on track to correctly determine whether FFR resource objectives and performance targets are being achieved.

There is no question that the FFR prescription based DFC targets and Type N demarcation rules and associated forest practice regulations were based on very little "science informing the rule" which is precisely why they were included in Schedule L-1 during FFR negotiations (WDNR 2000, Fairweather 2001, Palmquist 2003, Pleus and Goodman 2003). Schedule L-1 of the FFR specifically directs CMER to "Refine the demarcation between perennial and seasonal Type N streams" and to "Validate the Desired Future Condition (DFC) targets *within two years of the report.*" via the FFR Adaptive Management Program. The FFR Adaptive Management Board Manual (2004) does not direct Policy to second guess the intent of rule tool development and research by asking what the implications of CMER research results are from a political and economic perspective. Doing so undermines the credibility of a science based AM program.

That's not to imply that economic considerations are not important in achieving FFR goals as outlined in the Forest and Fish agreement which clearly states that one of the goals is to "keep the

timber industry economically viable in the State of Washington." The way to achieve this however, is not through the manipulation of a science based Adaptive Management program, but through a clearer understanding and definition of what "economic viability" means to *all* stakeholders not just the timber industry. Refining the definition of this particular FFR goal must first take place in another arena outside of adaptive management if the other three FFR goals are to be realistically achieved.

Conclusions

There are severe structural problems with the FPHCP Adaptive Management Program caused by the unregulated political intervention of a scientific process. These problems are shielded from independent scientific oversight of the Policy decision making process which threatens to undermine the scientific credibility of the FPHCP adaptive management program.

The Policy/CMER Interaction Framework document is an example of such political intervention as it attempts to second guess the intent of the Adaptive Management Program, as developed by stakeholders during rule negotiations, by co-opting a scientific process that is well defined under the FFR (2000), the FFR AM board manual (2004), the CMER Protocols and Standard Manual (2005), the CMER project technical ranking process (2003), and Schedules L-1 and L-2 of the FPHCP (2004). In doing so, Policy risks jeopardizing the scientific credibility of the AM program that serves as the foundation for how a successful Forest and Fish Agreement must be administered.

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ADDENDUM CONTINUED

FORESTS & FISH POLICY ADAPTIVE MANAGEMENT QUESTIONS

Prepared by the UPSAG Type N Technical Group
January 18, 2005

Study Title: Type N Stream Demarcation Study - Phase 1: Pilot Study

Study Summary. The Type N demarcation study is a water-typing project that validates the default basin areas used to identify the Type Np/Ns break. When combined with the "Last Fish Habitat" project, it delineates the endpoints of Type N waters. The pilot (Phase 1) study was envisioned as the first phase of a two phase project. The Phase 1 study was designed to test a field protocol and to collect basin area data to estimate the required sample size for use in the statewide study (Phase 2) to follow. It was anticipated that the Phase 2 study would incorporate a random sampling design developed from the results of Phase 1 to evaluate basin areas and other indicators to improve the demarcation of Np/Ns type breaks across the state.

The following document briefly addresses key questions likely to be relevant to adaptive management decisions. The questions included were taken from the CMER Protocols and Standards Manual (2004, section 7.2 H) but the sequence was changed to flow more logically.

Does the study inform a rule, numeric target, performance target, or resource objective? (question 1 in 7.2 H)

The study informs a rule. Default basin areas are neither numeric targets nor performance targets; they are simply a method of determining the location of the regulatory Np/Ns break when field evidence is not available or is inadequate to identify the initiation point of perennial flow.

Does the study inform Forest Practice Rules, the Forest Practices Board Manual guidelines, or Schedules L-1 or L-2? (question 2):

The study informs WAC 222-16-030 (3) and 222-16-031(4) of the forest practices rules. It also informs Schedule L-1 Hydrology, Other Research, b) Refine the demarcation between perennial and seasonal Type N streams, and Schedule L-2, Hydrology, H7: "Refine the demarcation between perennial and seasonal Type N streams."

Was the study carried out pursuant to CMER scientific protocols (i.e. study design, peer review)? (question 3):

Yes. The Phase 1 study design was prepared by the Np Technical Group and approved by UPSAG and CMER in the early summer of 2001. In late 2001, the Np Technical Group prepared a protocol that was approved by UPSAG and CMER. At this time, the SRC review process was not available and UPSAG and CMER decided that peer review was not necessary for a Phase 1 study. The Phase 1 report was reviewed and revised by a CMER-appointed panel and subsequently approved by CMER in early 2004. Policy then requested a SRC review and the Phase 1 study report was revised in early 2005 per SRC comments according to a CMER-approved action plan.

What is the scientific basis that underlies the rule, numeric target, performance target, or resource objective that the study informs? (question 6a)

The scientific basis for the existing default basin areas is the assumption that a minimum basin area can be used to predict the initiation point for perennial flow. The process and data employed to estimate the FFR default basin areas is not available in public documents but anecdotal evidence indicates that:

- The size of the default basin area in Western Washington (52 acre) region was inferred from a data set from western Washington collected during the FFR negotiations. The defaults for the Coastal zone and Eastern Washington (13 and 300 acres, respectively) regions were based largely on professional opinion.
- The basin area data was based on field observations that
    - Used various definitions of the Np/Ns break (e.g. included or excluded spatially intermittent segments),
    - Used various field methods to identify the location of Np/Ns break,
    - Used non-randomly selected and distributed sites,
    - Were conducted during a dry year.

What does the study tell us? (question 4a)

The Phase 1 Study achieved its four objectives:

1. *Assess the adequacy and replicability of the pilot protocol:* The Phase 1 protocol was found to be adequate for identifying the Np/Ns break and repeatable in a Phase 2 study with appropriate oversight and protocol modifications.
2. *Assess the variability of basin areas and other parameters*: The variability of basin areas was determined within default regions and precipitation zones. These data were used to estimate sample sizes required for the Phase 2 statewide study.
3. *Assess basin and channel attributes that are potentially useful in defining the Np/Ns break*: Channel and basin attributes were measured and tested; none of the targeted attributes were found useful for consistently identifying the Np/Ns break on the ground.
4. *Refine protocols for the statewide study*: Modifications important to a Phase 2 study would include revising the study design and sampling protocols to include but not limited to: surveying to the channel head, random tributary selection during the survey, expanding parameters for associated channel attributes, and consideration of the SRC recommendation to use other, more easily identifiable indicators of perennial flow initiation other than basin area. If Phase 2 is approved by policy, the field protocols will be refined accordingly.

The Phase 1 results provided additional insights into the characteristics of Type N streams that were unanticipated during the planning phase:

- The observed basin areas are much smaller than the default basin areas (medians roughly one-eighth) as summarized in the following table.

Region	Default Area (acres)	Phase 1 Observed Basin Areas		
		Median	Average	Sites
Eastern Wash.	300	36	118	43
Western Wash.	52	6	22	152
Coastal zone*	13	2	8	18

* Coastal zone sites are in a portion of Western Cascades region within close proximity to Coastal zone boundary.

- Distances from channel head to the Np/Ns break are generally very short (the regional median lengths are 2 to10 m), which indicates that Np waters begin at or near the channel head of most study streams. The close proximity between the channel head and the Np/Ns break indicates the channel head is a reliable and repeatable field indicator of the Np/Ns break.
- Distance from the basin divide to the Np/Ns break has less variability than basin areas. Distance from the basin divide is potentially a better mapping indicator of the Np/Ns break than basin area.
- Average annual precipitation is potentially a better basis for stratifying differences in the Np/NS break than the current default regions.

How much of an incremental gain in understanding do the study results represent? (question 6b)

Knowledge was gained in multiple aspects underlying the current Np/Ns demarcation rule including:

- Established a standard protocol for collecting data to identify the Type Np/Ns break
- Developed a documented, state-wide data set on headwater channels and basin areas
- Developed an extensive database on headwater channel attributes to inform other studies
- Determined that smaller drainage basins support perennial flow
- Determined that channel head distances to Np/Ns breaks are much shorter than previously assumed
- Identified alternative metrics and/or indicators for delineating Type Np/Ns breaks
- Determined existing default regions do not reflect distinct changes in hydrologic conditions.

What does the study not tell us? (question 4b)

Because the objectives of the Type N Demarcation Study are limited to refining the demarcation between perennial and seasonal non-fish bearing streams, neither Phase 1 nor Phase 2 are designed nor intended to address questions about the ecological functions, and the potential resource effects and management of Type N streams. Unaddressed issues are listed below by category:

Water-Typing Issues:

- The statewide distribution of basin areas supporting perennial flow within a specified statistical confidence interval and degree of precision (purpose of Phase 2).
- The year-to-year variability of the Np/Ns break. (addressed by recent non-CMER studies)
- The physical processes that control the initiation point of perennial flow (partially addressed by recent non-CMER studies).
- The downstream extent of Type N waters (F/N break), which is being addressed by the "Last Fish Habitat" and related studies within the CMER stream typing program (see the stream typing rule group section of the CMER work plan).

Some of the above issues could be addressed in the Phase 2 study.

Ecological Function & Management Issues:

- The ecological function distinctions between different classes of Type N channels and valleys
- Water quality characteristics (temperature, suspended sediment, nutrients) of Type N channels
- Physical habitat characteristics of Type N channels
- Biology, ecology or habitat utilization patterns of stream-associated amphibians in Type N channels
- Response of water quality, habitat, and stream-associated amphibians to physical processes or changes in inputs

- Effectiveness of FFR Type N and alternative management prescriptions in providing riparian functions and achieving, water quality, habitat or amphibians resource goals.
- Sediment dynamics of Type N streams
- Effects of Type N stream management strategies on downstream habitat, water quality and fish suitability.

Many of these questions and issues are discussed by projects in the Type N rule group section of CMER Work plan (CMER, 2004).

What is the relationship between this study and others that may be planned, underway, or recently completed? (question 5)

Many other studies concerning water typing in headwater streams and the function/management of headwater streams are available. These studies are too numerous to be cited here. The most relevant CMER studies and Non-CMER studies relevant to water typing of headwater perennial streams are summarized below.

Feasibility of obtaining more information to better inform Policy about resource effects. (question 5a)

As stated above, Phase 1 and 2 were not designed to provide information about resource effects (see question 2). However, because the regulatory protections for Ns streams are less than for Np streams, the accurate placement of the Np/Ns break affects the extent of protection provided to streams during resource-related studies. At CMER's request, the estimated length of Type Np channel that would be misclassified as Type Ns by using the default basin areas in a simple single-stream basin was documented in a white paper developed by the Type N Technical Group to supplement the Phase 1 Report (Palmquist, 2003). The estimated length of potentially misclassified Np water (per stream) was 3,319 feet in the Eastern Washington region, 1,263 feet in the Western Washington region, and 564 feet in the Coastal Zone.

Studies are available that directly or indirectly inform the issue of possible resource effects resulting from the misclassification of perennial streams, however, that was not the intent of this particular study. CMER is implementing or planning multiple Type N resource-effect studies which may produce results that indirectly address this issue. However, the results from these studies will not be available anytime soon for the purpose of informing policy about potential resource effects (see CMER 2005 Work Plan). There are also many non-CMER studies available that address the affects of various size riparian buffers on aquatic resources and functions of Type N streams..

Are other relevant studies planned underway or recently completed? (question 5b)

Yes. Several related studies have been completed and many more are planned. Studies that are directly relevant to water typing and the functions and management of headwater streams are briefly described below. The presentation is organized by source (CMER/Non-CMER) and issue (Water Typing/Function-Management).

<u>CMER Studies</u>

The 2005 CMER Work Plan contains many projects addressing the Type N Program. The two projects that directly address water-typing issues are described in the following paragraphs. The

remaining Type N projects (Table 1 at the end of document) consist of eight studies addressing management of Type N streams, and six studies specifically addressing stream-associated amphibians (SAA) Additional information on these studies and the strategy behind the Type N program are described in the CMER Work Plan.

The two proposed Type N projects that include the analysis of the Np/Ns break are:

- The Phase 2 Demarcation Study. It was anticipated that a Phase 2 study would incorporate a regionally distributed sampling design to address basin areas and field indicators of Np/Ns breaks across the state. This data set would provide a high level of certainty regarding default basin area figures. As previously noted, Phase 2 is conceptually designed but needs a study plan and peer review

- Type N Classification Project. The Type N Classification Project has been discussed but has yet to be scoped and designed in writing. It will develop a classification system for Type N streams to provide a context for interpreting channel response to management practices. We hypothesize that headwater streams in different hydrologic/geologic settings will respond differently to changes in sediment, wood, and water and thus management impacts. The project will identify important physical processes that affect the results of the Type N projects.

Relevant Non-CMER Studies

Numerous published studies describe aspects of headwater stream morphology and hydrology, stream functions, and management impacts. The management/function studies are too extensive to summarize here but those completed before 2000 have been summarized in two recent literature reviews available on the web (http://www.dnr.wa.gov/hcp/ type5/alphauthors.shtml) and (http://www.ncasi.org//Publications/ Detail.aspx?id=2623). Below we limit our discussion to articles that directly relate to the hydrologic and demarcation aspects relevant to the Phase 1 study. In this section we emphasize water-typing studies with relevance to the Type N Demarcation Study and one CMER related resource impact study.

Several notable studies related to perennial flow in headwaters streams have been completed since 2001 (Table 2). The two studies summarized below are of special interest because they received SRC review (i.e. Tribal Demarcation Study) or were done in association with CMER (i.e. Amphibian Recovery Project). An additional eight relevant perennial flow studies are summarized in Table 2. The Tribal Demarcation Study and five others in Table 2 (#1 through 5 in Table 2) identified Np/Ns breaks in the field and found drainage basin areas similar in size to those in the Phase 1 study. This agreement contrasts with two studies (#7 and 8) that estimated drainage basin areas from stream gage data and found larger basin areas than those in the Phase 1 study, presumably because they did not locate the Np/Ns break. Three studies in Table 2 (#1, 2 & 6) demonstrate that the Np/Ns break is typically located at or near the channel head and generally does not migrate more than 100 m downstream during the dry season or between years, although study #2 showed greater change between years. The Amphibian Recovery Project and three others (# 1, 4, and 5) illustrate the role precipitation and landscape conditions play in controlling the degree of intra-annual and inter-annual migration of the Np/Ns break and the location of the Np/Ns break in relation to the channel head.

Tribal Type N Stream Demarcation Study: The Type N stream demarcation study; 2002 Tribal perennial stream survey data collection (Pleus, A., and P. Goodman, 2003) reports on the relationship between basin area and the Np/Ns break in eastern (300 acre) and coastal (13 acre) default regions in

Washington. This study was a follow-up to the CMER Phase 1 study and expanded the sample size for eastern Washington. This study followed the revised protocol recommended in the Phase 1 report, but the protocol did not incorporate random selection of study basins or require random tributary selection. The Tribal Type Np study results support and improve upon the findings of the 2001 CMER study for observed Type Np basin area and Type Ns channel length. It effectively doubles the Eastside sample size and increases the spatial distribution of sites within the Eastside. The Tribal study reached the following conclusions:

- The basin areas associated with perennial flow for eastern (300 acre) and coastal (13 acre) Washington streams are similar to those reported in the 2001 Phase 1 study

Default Basin Area	Survey Year	Sample Size	Observed Median Basin Area (acres)
300 acres	2002	56	41
	2001&02 pooled	86	33
Est. 13 acres	2002	11	2

- 75% of all sites (both 13 and 300 acre regions) had Type Ns channel lengths less than 30 meters (~90% less than 100 meters)

Default Basin Area	Survey Year	Sample Size	Observed Median Type Ns Length (meters)
300 acres	2002	55	0
	2001&02 pooled	67	0
Est. 13 acres	2002	11	8

- Analysis found no significant changes between years (inter-annual variability) in observed location of the Np/Ns break.

The Tribal Demarcation study was submitted to CMER's independent scientific peer review process at TFW Policy's request at the same time as the Phase 1 pilot study. Comments were received from three anonymous reviewers. Reviewers A and B concurred that the use of the default basin areas are not representative of locations of the Np/Ns break on the landscape. All reviewers also concurred that the Tribal study met its goals/objectives and that the data and analysis are sufficient to support the findings. Furthermore, Reviewer A noted that "The distance between the channel head (Ch) and point of perennial flow (Pd) was small (median value < 30 meters) and may be insignificant in the context of forest practices," and Reviewer B noted that "The authors provide strong evidence that threshold values that are currently used to identify Pd [the Np/Ns break] are not representative of the larger area and should not [*reviewer emphasis*] be used for management."

Amphibian Recovery Project: The recent NCASI/CMER report "Recovery of Amphibian and Invertebrate Communities in Recently Logged Coastal Range Headwater Streams" (Jackson, C.S., D.P. Batzer, S.S.Cross, S.M. Haggerty, and C.A. Sturm, 2003) included the physical characteristics of 42 headwater streams in southwestern Washington. The study summarizes the same channel characteristics as the CMER Phase 1 report as well as additional information on channel morphology, wood/sediment interactions, and aquatic resources. In addition, the study provides the following insights on resource impacts:

- The importance of buffers on stream response to timber harvest – clearcut to banks increased fine sediment in channels by 13% to 40%

- The response of amphibians to timber harvest – tailed frogs disappeared, torrent salamanders were unaffected, and giant salamanders decreased in abundance.
- The role local conditions (geology, topography, etc) play in determining the function of the headwater stream and its resilience to disturbance.

What are the costs associated with additional studies? (question 5c)

The cost of the Phase 2 of the Type N Demarcation Study depends upon aspects of project scope that remain to be determined by Policy. These variables include the level of statistical precision desired, whether to stratify the sample within existing or precipitation-related regions, whether to continue looking for field indicators, and others. Presently Phase 2 has approximately $300,000 reserved in the 2005 CMER budget based on a preliminary cost estimate. Implementation of all the CMER headwater studies in Table 1 is estimated at approximately 7.5 million dollars through 2010.

What will additional studies help us learn? (question 5d)

Additional water typing studies can potentially help us identify the Np/Ns break with more certainty and greater ease. More specifically, a Phase 2 study would provide us with statistically rigorous basin area defaults for the Np/Ns break by region or by precipitation zone. Many SRC reviewers pointed out that the channel head is a better field indicator of the Np/Ns break than basin area and should be emphasized in future studies. Additionally the SRC reviewers commented that basin area defaults are overly simplistic, and that other factors such as geology, soils, and climate are also controlling factors on the location of the Np/Ns break. They suggested that an alternative default to basin area could be a multivariate regression equation that predicts the location of the Np/Ns break based on readily available data (i.e. soil texture data from published soil surveys; rock type from statewide geologic maps; and average annual precipitation). These SRC-suggested approaches could become components of the Phase 2 study.

No studies currently in the CMER work plan directly assess the resource impacts that result from incorrectly identifying the Np/Ns break. A number of future CMER studies (Table 1) will be assessing the effectiveness of different management activities (i.e., riparian buffer strategies) on riparian obligate species diversity and abundance, riparian habitat response, and water quality response in headwater streams. These data may be used to indirectly infer potential resource impacts due to incorrectly identifying the Np/Ns break, but will not be completed for several years.

When will these studies be completed? (question 5e)

The status and projected completion dates of the CMER Type N studies vary as shown in Table 1.

Will additional information from these studies reduce uncertainty? (question 5f)

Phase 2 of the Type N Demarcation Study will further reduce uncertainty about basin areas association with the Np/Ns break by defining the statistical level of uncertainty. Because a random sampling system would be used, the results will provide a statistically valid characterization of the Np/Ns-basin area relationships across the state. However, given the large sample size and the statewide distribution of sites in the Phase 1 study, and the supporting data from the tribal study, results from a Phase 2 study will likely produce similar results.

Furthermore, due to the large sample size and statewide distribution of the sites, when the CMER co-chairs (Timothy Quinn and Doug Martin) first presented the Pilot Report to Policy it came with the recommendation that additional studies would not likely yield significantly different results (FFR Policy minutes). The Pilot study results could be used to inform a number of possible adaptive management scenarios (e.g. change defaults values or eliminate acreage defaults altogether) and the

value of additional information depends on the specific change being proposed. For this reason, Policy should identify possible actions to help weigh the cost of reducing the level of uncertainty (i.e. more studies) against the incremental gain in Type N demarcation methods.

Table 1. Type N studies proposed, underway, or completed by CMER that address ecological function/management issues.

Project	Description	Possible Resource Information about water-typing impacts	Status	Resu Availa
Amphibian Recovery Project	The effects of 3 buffer treatments on headwater streams in the Willapa Hills and Olympic Peninsula in basins containing many of the FFR stream associated amphibians (SAAs)	Provides direct information on the impacts of different buffering strategies on stream associated amphibians. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on SAAs.	Complete	200
Type N Buffer Integrity, Characteristics Function	Evaluate the effectiveness of the FFR Type-N riparian prescriptions, including survival of buffer leave trees, and changes in riparian functions including shade, LWD recruitment, and stream bank protection	Assesses the impacts of different buffering strategies on water quality and could be used to infer possible impacts from misclassification.	Phase I underway	200
DNR Type 5 Study	Compares the response of riparian stands, temperature, litter fall, nutrients, small mammals, amphibians, and downed wood to a range of buffer treatments applied in sets of small paired watersheds	Provides direct information on the impacts of different buffering strategies on water quality. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on water quality.	Underway	200
Stream Associated Amphibians Detection, Relative Abundance	Evaluates and develops a standard methodology for sampling stream associated amphibians in headwater forest streams.	Develops a method to survey amphibians and in itself is not applicable to resource assessment.	Underway	200
Tailed Frog Literature Review	Reviews the Tailed Frog literature and re-analyzes the data to better define CMER's stream associated amphibians studies	Reviews existing information to inform other studies. The information could be used to inform the possible impacts of different buffering strategies on SAAs.	Underway	200
Dunn and Van Dykes's Salamander	Assesses the importance of large woody debris to these stream associated amphibians	Applicable to the degree large woody debris is related to buffer strategies	Underway	200
Buffer Integrity-Shade Effectiveness	Examines the effects of shade retention on tailed frog and torrent salamander density, body condition, and spatial distribution, water temperature, primary productivity, and macro-invertebrates.	Provides direct information shading by buffers on SAAs. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on SAAs.	Underway	200
Type N Experimental Buffer Treatment	Compares the effect of three different Type N buffer treatments with an untreated control to assess their effects on amphibian populations in the southwestern part of the state.	Provides direct information on the impacts of different buffering strategies on water quality. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on water quality.	Design	Unkno
Type N Riparian Extensive Monitoring	Assesses the current status of riparian conditions and stream temperature across FFR forest lands and documents changes in these conditions over time	Not applicable – a status and trend project that may provide supplementary information on different buffering strategies.	Design	Westsi 200
Tailed Frog Parent Geology	Assesses the hypothesis that tailed frogs are most abundant in streams on hard or competent rock (volcanic basalt) than those that are not (marine sandstones)	Applicable in context with the Type N classification project which hypothesizes that different streams react differently to impacts.	Design	Unkno
Intensive Monitoring	Assesses the cumulative effects of harvest and roads in Type N basins on inputs and resources within the Type N basin and in downstream fish-bearing streams.	Provides direct information on the impacts of different buffering strategies on water quality. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on water quality.	Scoping	Unkno
Type N Performance Target Validation	One or more studies designed to validate the relationships between Type N performance targets and aquatic resource response	Provides direct information on the impacts of different buffering strategies on water quality. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on water quality.	No action	--
Type N Water Quality/Downstream Effects	Assesses the effects of Type N riparian prescriptions on downstream water quality and fish habitat	Provides direct information on the impacts of different buffering strategies on water quality. The results are directly applicable to assessing the potential impacts of misclassifying Type Np on water quality.	No action	--

Table 2. Non-CMER water-typing studies directly related to the Phase 1 study. Studies toward the top of table are most comparable to Phase 1 Type N study due to similarity of protocols and geographic proximity.

No.	Location	Approach	Description	Results	Reference
1	Northwest Cascades, Washington	CMER protocol	A study of year-to year variation of the Np/Ns break and surface water in spatially intermittent segments of 17 headwater basins in Skagit and adjacent watersheds.	The Np/Ns break is near ~90% of channel heads during years of typical and unusually low rainfall. The basin areas providing water to Np/Ns breaks (2 to 6 acres) are similar to Phase 1 results.	Veldhuisen, C., 2004
2	Southwest Washington and Eastern Cascades	CMER protocol at some sites	Sampled 148 perennial "stream origins" in 1998 and 2001 using different protocols. The 1998 sample was conducted to inform the FFR negotiations and the 2001 sample was part of the Phase 1 CMER study.	Median Np/Ns basin areas range from 13 to 39 acres on both the Eastside and Westside in both 1998 and 2001. Np/Ns breaks were located farther downstream during the dry 1998 summer relative to the wetter 2001.	MacCracken, J.G., and W. C. Boyd, 2003
3	Southwest Cascades, Washington	Similar to CMER protocol	Surveyed 86 basins on Kapowsin tree farm to identify perennial initiation points (PIP) and spatially intermittent initiation points (SIIP).	The median basin areas for SIIPs to be 17 acres and for 40 acres for PIPs. Basin areas differ between Landscape Situations.	Liquori, M. K. (submitted)
4	Southwest Washington	Similar to CMER protocol	Studied the location of the Np/Ns break in 81 headwater basins in two differing rock types (basalt, sandstone) in the Willapa Hills	Median basin areas (4 to 6 acres) and length of seasonal stream were similar to Phase 1 results. Intra annual migration was short (< 16 m) and related to rock type.	Jaeger, K., 2004
5	West Virginia	Similar to CMER protocol	The beginnings of spatially intermittent and perennial flow were identified by field surveys in October for 47 headwater basins	Basin areas to maintain intermittent flow (similar to Np/Ns break) is between 12.9 acres and 20.4 acres across the state, which is similar to Phase 1 results for areas of similar rainfall.	Paybin, K.S., 2003
6	Southwest Washington	CMER protocol	Repeat surveys of 17 headwater basins in the Stillman Basin following the 2001 protocol to assess seasonal changes in surface water.	The location of the Np/Ns break remains at or near the channel head and migrates less than does the upper end of continuous water. Study provides no basin area data.	Hunter, M.A., T. Quinn, and M.P. Hayes (in press)
7	Puget Lowlands, Washington	Different from CMER protocol	Basin area supporting continuous perennial flow (different from Np/Ns break) was determined by analyzing stream-gage data using logistic regression.	Continuous perennial flow in urban and suburban basins typically occurs in basin areas greater than 296 acres, which is much larger than Phase 1 results	Konrad, C.P., 2001
8	Cape Cod area, Massachusetts	Different from CMER protocol	Intermittent channels were identified at bridges (Np/Ns break not located) as either dry or with discontinuous water	Median basin area for wetted crossings was 134 acres, which is larger than Phase 1 results.	Bent, G.C, and S.A. Archfield, 2002

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ADDENDUM CONTINUED

Estimated Length of Affected Stream Channel
Prepared by Robert Palmquist, CMER
Reviewed and accepted by the *ad hoc* CMER Type N Stream Demarcation Study Review Committee, September 10, 2003

Introduction

The pilot results from the Type N Stream Demarcation Study indicate that the FFR default basin areas for determining the Np/Ns break are significantly larger than observed basin areas above the break. Because the default basin areas are used to estimate the location of the Np/Ns break at sites where non-migrating springs and seeps are not observed, the default basin areas should predict the location of the Np/Ns break with an acceptable level of accuracy. To explore this issue, CMER requested that UPSAG estimate the length of channel potentially affected by the difference between observed and regulatory basin areas. This paper addresses the issue.

Summary Statistic	Eastside (300 acres)	Westside (52 acres)	Coastal (13 acres)
Number	43	132	18
Average	118	24	8
Median	36	7	2
Standard Deviation	242	44	20
Minmum	0.4	0.7	0
Maximum	1224	260	85
1st Quartile	9	4	1
3rd Quartile	68	24	5
Coefficient of variation	206	182	249

Table 1: Summary statistics for basin areas above Pd, the Np/Ns break, by FFR default region. Basin sizes are in acres.

Basin Areas

Table 1 presents summary statistics for observed basin areas by FFR default region. The observed basin areas are consistently smaller than the default basin areas.

Channel Lengths

Methods

The relationship between basin area and distance downstream can be estimated by regression analysis and the regression then used to estimate the medial location of Pd based on FFR default basin areas (FFR distance). The regression analysis is more fully described in the pilot report. Analysis of covariance indicates that all regressions are similar ($\alpha = 0.10$) and that the statewide regression is applicable to all study areas within the state. The statewide regression is very significant ($p = <0.001$) and explains nearly 70 percent ($r_{Pd}^2 = 0.68$) of the covariation **(Figure 1)**.

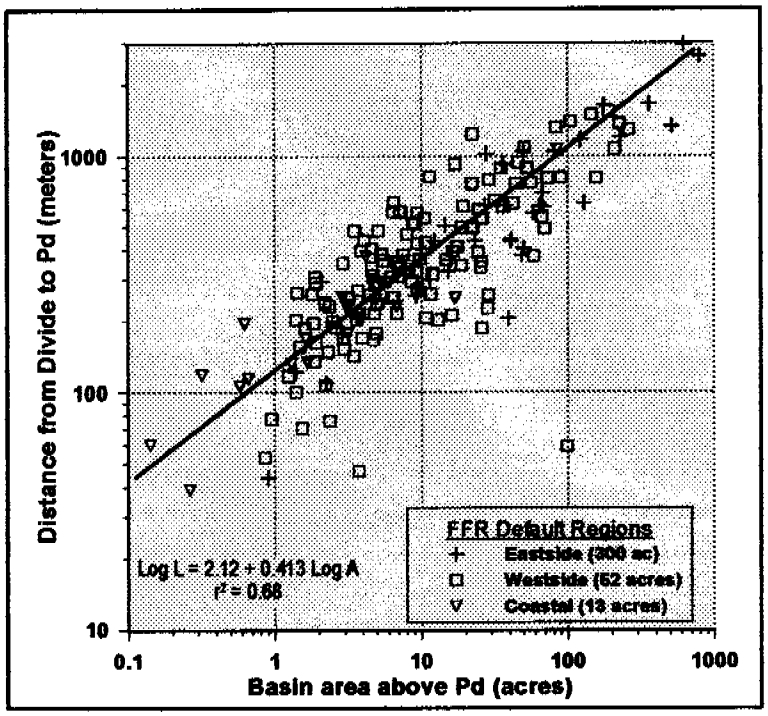

Figure 1: Distance from divide to basin area. Scatter diagram showing distance from divide to Pd and basin area above Pd. Regression equation is significant at $p < 0.00$

The statewide regression was used to estimate the FFR distance. The estimated FFR distances are based on log-transformed data and thus estimate the median distance of the observed data. The FFR distance is compared to both the median and average of the observed distance in each study area and the difference between observed distances and estimated FFR distance is calculated. This analysis applies directly a to simple basin, that is, a basin wherein only a single Type Ns (seasonal) channel lies upstream of the Np/Ns break. It will underestimate the length of affected channel in basins where two or more seasonal channels join upstream of the Np/Ns break.

Results

The relationship between observed and FFR distance downstream is shown in **Figures 2** and **3**. As shown in **Figure 2**, the FFR distance places Pd downstream of the observed median location of Pd for all of the study areas, and downstream of the observed average location for all but one study area (COL – 15). Moreover, in all but three study areas, the FFR estimated location lies downstream of the 75th percentile of the observed distribution. The prediction interval of the regression is large. Thus, the potential errors in estimated distances of affected channel are large, and could be more than 100 percent.

In **Figure 3**, the scatter diagrams between distance downstream and basin area include sites classified by the presence or absence of the channel head. The data plots along the statewide regression with the greatest density around the median observed basin area and distance downstream. The default basin area and estimated FFR distance cross the tail of the observed distribution and only a few sites have observed basin areas that are equal to or larger than the default basin areas. On the Eastside, all of these large-basin sites lack a

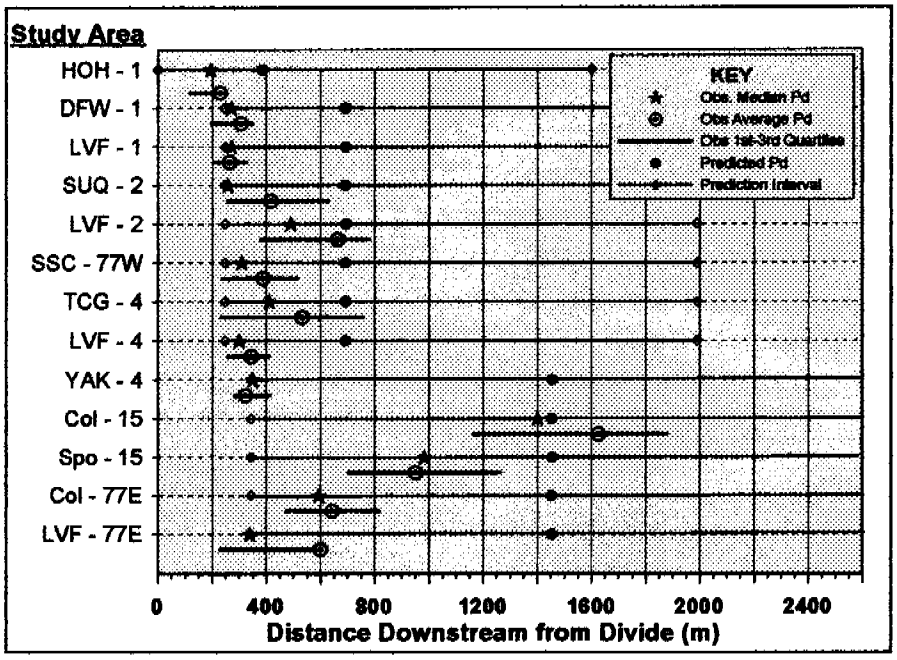

Figure 2: Observed distance downstream from divide to Pd (Np/Ns break) compared to distance downstream estimated from FFR default basin areas. The predicted location of Pd is based on log-transformed data and when back transformed is the median of the arithmetic (observed) data. The prediction interval is a measure of the

channel head, whereas on the Westside and Coastal regions, they are a mixture of channel head and no channel-head sites.

The differences between the observed and FFR estimated distances in each study area are summarized in **Table 2.** The length of stream channel lying between the FFR estimated and observed Pds (the affected reach) differs by FFR default area and measure of central tendency (average, median). The affected reach can be as short as 107 meters (~300 feet) to as much as 1,200 meters (~4,000 feet). The estimated lengths of the affected reaches are summarized by FFR default region in **Table 3 (Note: All distances in Table 3 are in feet)**.

Table 3: Summary of estimated lengths (in feet) of affected reaches by FFR default region. The regression estimates the FFR distance from the default basin area. The estimate is the average which back transforms to the median of the arithmetic (observed) distribution. The median difference is the most appropriate measure of the "affected length."

FFR Default Region	Difference between FFR Distance and Observed Distance	
	Median (feet)	Average (feet)
Eastside	3,319	2,512
Westside	1,263	932
Coastal	564	456

Discussion

The estimated length of the affected reach is around 1,000 feet on the Westside and 3,000 feet on the Eastside. With few exceptions, the observed location of Pd is a substantial distance upstream from the FFR estimated location. However, the observed location is closer to the FFR estimated location on the Eastside and in two Westside study areas.

The FFR estimated and observed locations are most similar in those study areas (COL, SPO, and TCG) where the channel head was not consistently captured by the surveys. When no channel head is included in the survey data, Pd was placed at the last upstream location of perennial water in the channel. In these cases, it is possible that perennial water also occurs further upstream and closer to the channel head and that this procedure results in the maximum estimate of Pd basin area and in distance downstream from the divide. The data from the LVF – 4 study area is similar to that on the Eastside. It results

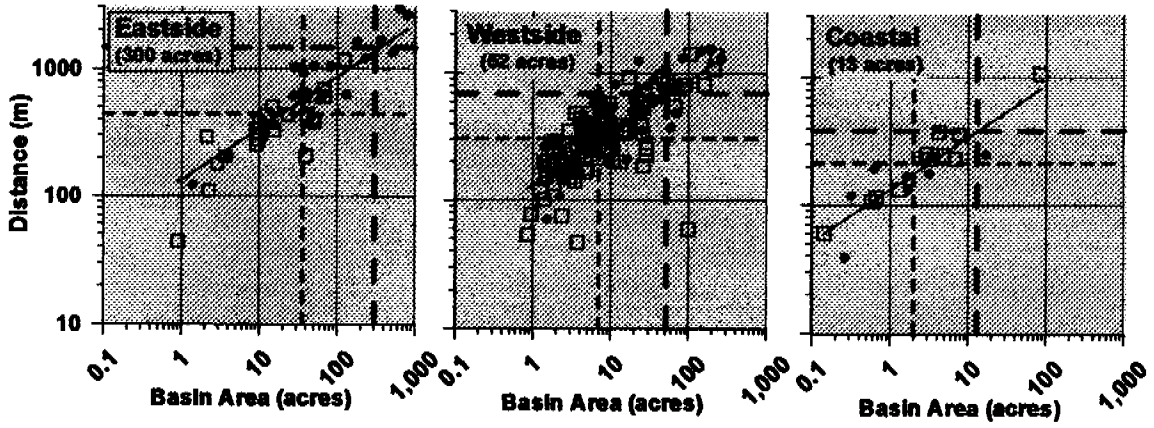

Figure 3: Scatter diagrams showing the relationship between distance downstream from divide to basin area above Pd by FFR default regions. Included on the plots are FFR default basin area and the observed median basin area and distance downstream. The data are presented as surveys in which the channel head was reached and recorded and those in which the channel head was either not reached or not recorded.

from the presence of one very large and long basin that distorted the results of a small sample (N = 4) that was otherwise similar to other Westside study areas.

Table 2: Differences between estimated and observed distances downstream from the divide to Pd (the Np/Ns break). Difference is assumed to be the length of perennial stream existing between the two points (estimated – observed). All distances are in meters.

Coop	Default Basin Area (ac)	Ecoregion	Point	Size	Observed Distances (meters)	Estimated Distances (meters)	Difference[1] (meters)
HOH	52	1	Median	18	212	384	172
			Average		245	384	139
Eastside			**As above**				
DFW			Median	21	287	691	404
			Average		311	691	380
SUQ		2	Median	6	258	691	433
			Average		373	691	318
LVF -4		4	Median	8	389	691	302
			Average		389	691	302
TCG[2]			Median	43	495	691	196
			Average		595	691	96
SSC		77 West	Median	18	353	691	338
			Average		436	691	255
Westside			**Median**	**150**	**306**	691	**385**
			Average		**407**	691	**284**
SPO[2]	300	15	Median	10	1,122	1,453	331
			Average		1,220	1,453	233
COL[2]		77 East	Median	6	593	1,453	861
			Average		638	1,453	815
LVF- 77E			Median	9	338	1,453	1,115
			Average		634	1,453	819
YAK		4	Median	10	349	1,453	1,104
			Average		333	1,453	1,120
Eastside			**Median**	**41**	**441**	1,453	**1,012**
			Average		**687**	1,453	**766**

1 Estimated - observed

2 Surveys frequently did not capture channel head; observed Pd distance is a maximum estimate of actual distance.